Municipal Journal

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MUNICIPAL ASPHALT PLANT OF MANHATTAN BOROUGH

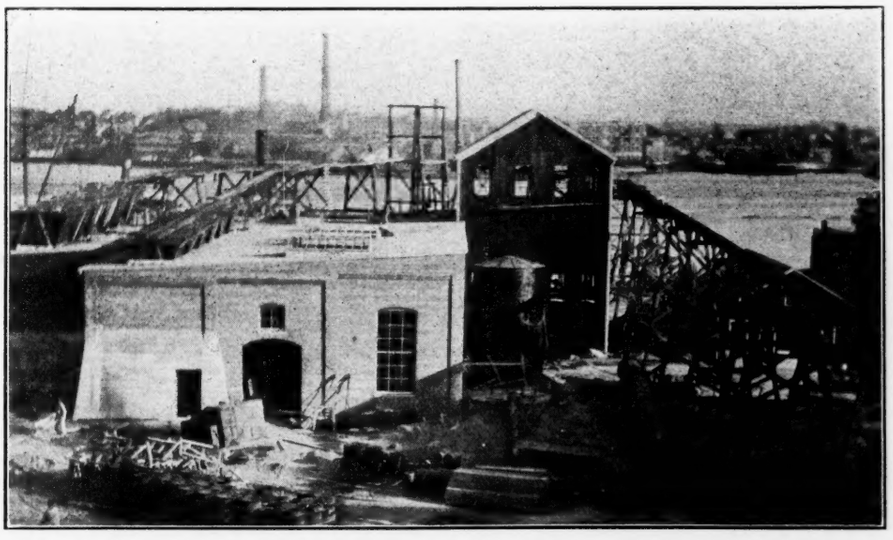
Largest Municipal Plant in the Country—Capacity Thirty-five Hundred Square Yards of Complete Sheet Asphalt Pavement a Day—Details of Appliances and Construction.

By DANIEL B. GOODSELL, Assistant Engineer, Highway Bureau, Manhattan.

A plant for the manufacture of asphalt pavement materials, to be operated by the municipality, has been constructed by the Borough of Manhattan, New York City. The plant, as at present equipped, will have the largest capacity of any municipally owned asphalt plant in the world. It comprises several connecting buildings and a large yard, which, beside being used for asphalt paving plant purposes, is designed to be used as a general storage yard for the Department of Public Works.

The plant is located on Avenue A, between 90th and 91st streets and the East river, and has a frontage of 201 feet on Avenue A, 542 feet on 90th street and 362 feet on 91st street. The plot is entirely surrounded by a brick wall, with the exception of the waterfront, and has but one entrance and exit, which is located on 90th street.

The elevated material is discharged into a hopper on a tower, which is located at the beginning of three wooden trestles leading to bins where sand, stone and coal are stored. The material in the hopper on the tower is fed into automatic side dump cars of 40 cubic feet capacity, which are operated by gravity through a triangular counterweight. The sand and stone are dumped through hopper-shaped openings in the roof of the building into concrete storage bins of 600 and 1,200 cubic yards capacity each, which are included under the cover of the main roof of the building. The material is reclaimed from these bins by spiral conveyors and elevated to the top of the rotary driers by means of bucket conveyors. The material passing through the driers is heated and discharged at the foot of a bucket elevator which conveys it to the hot sand and stone storage bins. These elevators are enclosed with a steel sheathing.



GENERAL VIEW OF ASPHALT PLANT.

Here follows a brief description of the machinery and apparatus used in the plant:

Handling Material.—On the waterfront at the bulkhead is located a Meade-Morrison hoist, equipped with a King grab bucket of 40 cubic feet capacity, which is operated on a wooden mast and yard. The hoisting machinery consists of a 10x12-inch double cylinder, double friction drum engine, with an 80-h.p. vertical fire-tube boiler, designed for a working steam pressure of 150 pounds.

The hot sand passes through a rotary screen at the top of the bin, the tailings being conveyed to the ground floor at the stone elevator, where they may be re-used in the making of binder. The sand is discharged from the screen into a steel hopper-bottom bin of 600 cubic feet capacity. The hot stone storage bin has a capacity of 450 cubic feet and is fitted with a partition to accommodate different sizes of aggregate. The hot stone and

sand are discharged as desired into a weighing box, through hand-operated gates.

The flux oil is delivered at the bulkhead by tank barges and is pumped to a storage tank of 25,000 gallons capacity through a 6-inch pipe, the tank being located about 250 feet from the bulkhead. For use at the asphalt melting kettles, this oil is automatically pumped to a weighing tank equipped with a beam scale, on a movable track, and from this is poured into melting kettles in charges as desired.

There are three asphalt kettles, each having a capacity of 20 tons.

The barrels of asphalt are delivered to the desired melting kettles by means of a platform elevator and tip cars on a narrow gauge track placed over the tanks.

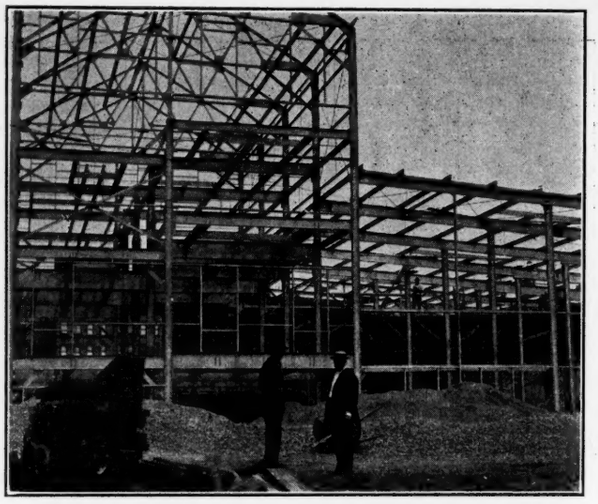
Weighing and Mixing.—The asphalt is agitated by means of steam or air, as desired, and is heated by steam coils placed in the bottom of the tanks.

The asphalt cement is discharged from the melting kettles through steam-jacketed pipes equipped with quick-opening gate valves, into a weighing bucket. The bucket is hung on a trolley, which permits receiving charges from any desired melting kettle and delivering it to either mixer.

The charges of sand and stone are weighed in a specially designed weighing box, equipped with a triple beam scale, so arranged that the tare and the two ingredients may be weighed without computation.

A third overhead bin with a hopper bottom for the storage of cement or stone dust is provided. The material is elevated by means of a platform elevator and delivered on a narrow gauge railway immediately above the storage bin. It is discharged from the bottom of the bin into a spiral conveyor, which is operated by means of a hand lever, so that the amount of material required for each charge can be regulated by the operator at the main weighing box on the mixer platform.

Mixers.—The sand, stone and cement are dumped from the weighing boxes into the mixers, which are of 16 cubic feet capacity and are provided with revolving manganese steel blades which coat the sand or stone. Upon the completion of this operation the aggregate is discharged through a steam-operated gate in the bottom of the mixer. The top and binder mixers are completely steam jacketed, the steam for use in these jackets being supplied by the exhaust from the cylinders which operate the discharge gates of the mixers. The asphalt and binder mixers are both placed upon the floor in order to save headroom.

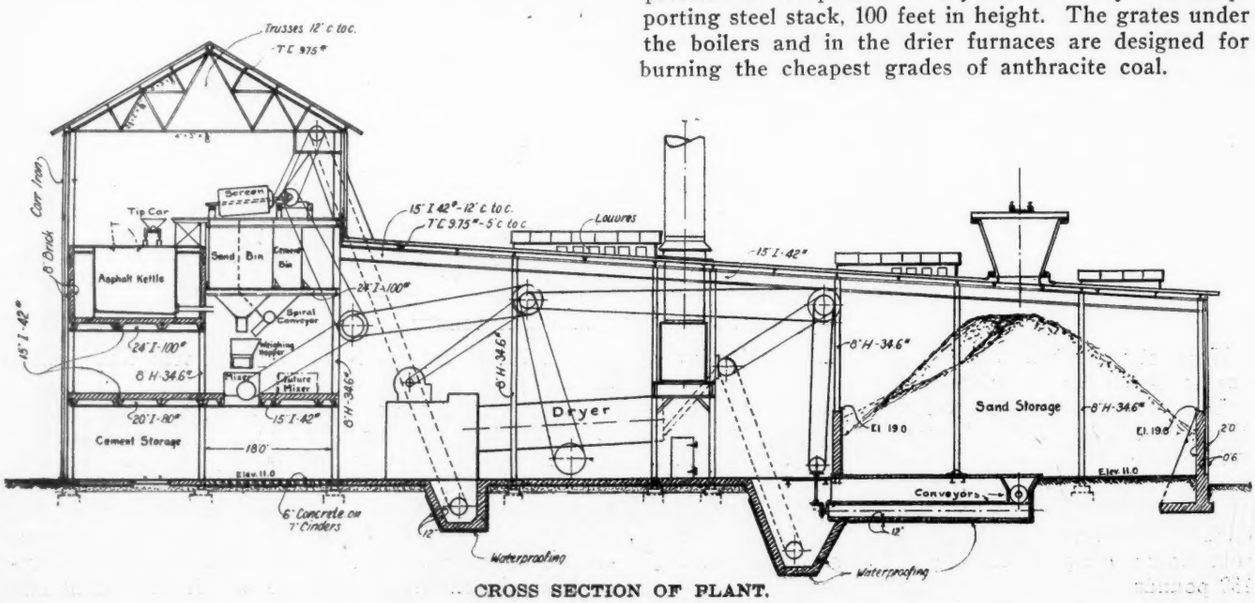


STEEL FRAME OF PART OF BUILDING.

Driers.—The plant is provided with three rotary drum pattern driers, two for sand and one for stone. Space is provided for the installation of a fourth drier should it be required. Each drier is guaranteed to dry and heat 15 tons of sand per hour, the capacity being based on a temperature of 400 degrees Fahrenheit in the driers and 6 per cent moisture in the sand. They are provided with plain grates and forced draft. Each is 5 feet 6 inches in diameter and 24 feet long; it consists of a single steel shell, on the inner periphery of which are riveted twelve 6-inch channels. The gases pass directly through the shell in the opposite direction to the material.

The gases and dust from the driers pass through a horizontal steel flue and enter the top of a dust-washing chamber, which is provided with a stack for the exhaust of gases and baffle plates and piping, so that the dust and gases pass through sheets of water. The water is supplied from the river by means of a centrifugal pump.

Engines and Boilers.—The plant is provided with two water-tube boilers of 150 h.p. each of the Babcock & Wilcox type. They are designed to carry 150 pounds pressure, but it is the intention to use a working steam pressure of 100 pounds. They are served by a self-supporting steel stack, 100 feet in height. The grates under the boilers and in the drier furnaces are designed for burning the cheapest grades of anthracite coal.



CROSS SECTION OF PLANT.

The main engine for operating the plant is of 150 h.p. capacity of the horizontal Corliss type. It drives the main shaft through an 18-inch belt and operates the following machinery:

Top and binder mixers of 16 cubic feet capacity; three 15-ton driers; one centrifugal pump; one sand screen; bucket elevators; platform elevator; spiral conveyors for sand and stone.

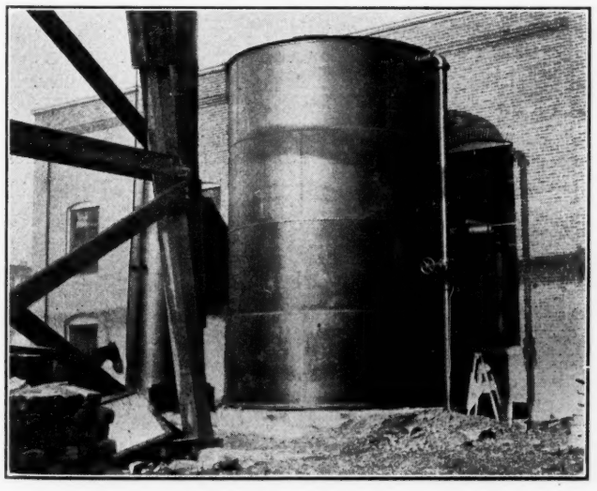
The exhaust steam and the returns from the condensation of high pressure coils is returned to a Webster 200-h.p. feed-water heater, from which it passes to the horizontal duplex feed water pump. The feed water may be delivered to the boilers either by the steam pump mentioned or through injectors.

The forced draft for the driers is furnished by a disk fan, driven by a vertical high-speed engine located in the main engine room. The discharge from this fan passes through a duct located beneath the floor to the driers and is regulated by means of a damper in the ash pit of each drier furnace.

The air compressor for agitating the heated asphalt is of the Ingersoll-Rand type and is located in the main engine room.

A horizontal duplex 6x4-inch pump for elevating the flux oil from the storage tank to the weighing bucket is provided with an automatic valve for starting and stopping as the discharge valves on the end of the air line at the melting kettles are opened or closed.

The record of the temperatures of the various ingredients entering into the mixers, including sand, stone and asphalt, will be registered on an automatic recording instrument placed in the laboratory.



FLUX OIL STORAGE TANK.

The plant building has been so designed that future apparatus may be installed to double the output by the addition of one boiler, one drier, one mixer and one melting kettle.

The plant is equipped with shower rooms, toilets and lavatories for the use of the plant employees. A separate office building is provided for a laboratory and for necessary clerks for keeping records. It will be heated by a hot-water system.

The plant and yard will be lighted by electricity.

The cost of the plant, exclusive of any street equipment, is about $120,000. Its estimated capacity is 3,500 square yards of completed asphalt pavement in a day of 8 hours.

It is intended to begin street repairs at the plant early in April with the necessary equipment for seven gangs, including seven asphalt rollers, the necessary fire wagons and small tools.

The work of construction was done by the North Eastern Construction Company, of New York City. The plans were drawn, under the direction of E. P. Goodrich, consulting engineer to the president of the Borough of Manhattan, by J. C. Wolfe, assistant engineer, Department of Public Works, Borough of Manhattan.

Former borough president George McAneny was instrumental in securing appropriations for carrying out this work and has been actively interested in this pioneer scheme for municipal operation.

PORTABLE VS. STATIONARY ASPHALT PLANTS

Experience With One Plant of Each Kind in Winnipeg, Manitoba—Reasons Why Writer Prefers Portable Plant.

By J. W. ASTLEY, C. E.*

The writer, as the city's engineer of construction, is required to bid against all classes of contractors and, consequently, sees things from a contractor's point of view, viz., what are the quickest, cheapest, and most reliable methods? When he was appointed engineer of construction of Winnipeg in 1907, he had to adapt himself to circumstances as he found them. The city at that time had a stationary plant capable of handling 2,000 square yards per day of finished sheet asphalt pavement, 1½-inch binder and 2-inch surface. At the present time, by the use of labor-saving appliances, the same plant can handle 3,000 square yards of the same class of pavement per day, with 30 less men per day at the plant.

This plant was so situated, however, that the only materials that could be delivered to it by rail were asphalt, flux and sand. All other raw material had to be teamed 1½ miles from a supply yard. The purchase of another, a one-car Cummer plant, was recommended in 1910 and has been in use ever since. In this plant the material is dumped from an overhead railway right above the plant, and the saving in hauling and handling material amounts to a trifle over 3 cents per square yard on binder, this being shown by the actual records for four years; and a saving of 4 cents per square yard is made when handling asphaltic concrete, which is laid 2 inches thick on a concrete base. The old plant is used on surface, also for streets in the immediate vicinity, and a saving of from one cent to 2 cents per square yard is made. This saving on the surface is effected by a small reduction in the amount of fuel for melting and in labor.

The question of cost of long haul in delivering material to the street is not so important here as in many cities, because we use a truck carrying 5 cubic yards of asphalt and hauling a trailer with another 5 cubic yards. This truck, which was made by our own mechanics, makes 12 miles per hour empty and 8 miles loaded. Three gasoline tractors also are used, each of which handles a train of five 2½-cubic yard asphalt wagons. These make 3½ miles per hour loaded and 6 miles empty. In another respect our plants are different from the majority, being operated by electricity, the only fuel used being for melting, heating sand, stone, etc., the melting all being done by direct heat with mechanical agitators.

In operating our plant no uncoupling of the strings of wagons is necessary, as they are drawn under the hopper by a cable operated by the regular engineer. The asphalt is hoisted and swung into the melting kettle by a small swinging derrick operated by the same man, and the hopper is handled by the same means.

*Engineer of Construction of City of Winnipeg, Man.

The one-car plant which we have in use we always count on, from actual practice, for 3,000 square yards of 1½-inch binder a day and from 1,800 to 2,000 square yards of 2-inch surface. We always operate the plant nine hours, which gives the street gangs practically 10 hours' work.

The stationary plant was the first stationary municipal plant in Canada and, it is believed, the first on this continent, and, consequently, was not built as we would do it at the present time; steel and concrete would be used in place of wood. The maintenance costs are, therefore, greater than they would otherwise be, so a comparison in this respect would not be fair. The yearly maintenance cost for the one-car plant is very small, as, outside of a few new sprocket chains, small repairs to fire brick and to a dust collector, nothing has got out of order, and $300 per year so far has covered all our expenses for repairs.

The question of our future has already been taken in hand, by the purchase and outfitting of supply yards with elevated railway tracks. After possibly another year, the one-car plant will be moved to one of these yards and do all the work within a reasonable haul, and then move to the next yard and district. The stationary plant will then be done away with, and when the amount of work warrants it the purchase of a second one-car Cummer plant will certainly be recommended by the writer.

From my point of view I would prefer to purchase a one-car plant for use in any town of, say, 60,000 people in place of building a stationary plant; for even if it is left stationary for some years it will be found to occupy less room, cost less to keep in repair, and will do as much work as a stationary plant costing the same money. For larger cities that have enough work for two or more plants I would again recommend one-car plants, and more especially if the city has numerous railway lines, making it possible to move the plants near to the work in any district. This makes it possible to operate a plant more on the outskirts of a city. If not on city property, property can be the more easily rented.

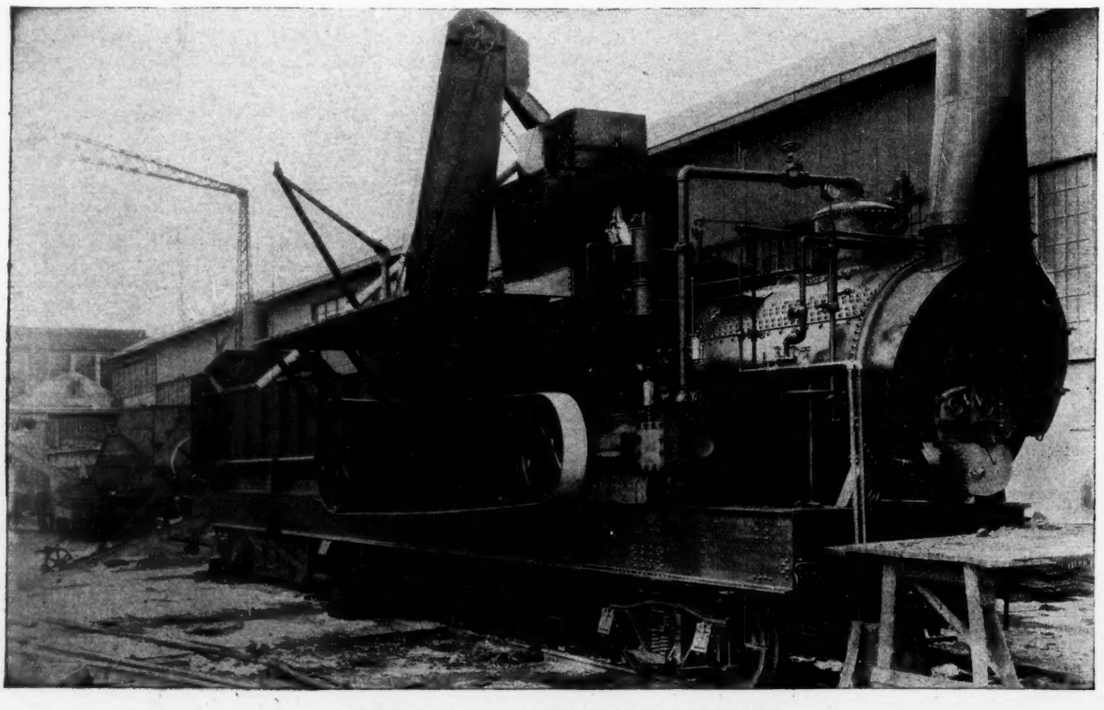
The main question from a contractor's point of view (and it should be the city's) is to get cheap delivery and handling of material at the machine. The question of delivery to the street and laying the asphalt can be easily checked up daily and a general hustle kept up, but the other end of the work is where expenses creep in and are very hard to detect.

In actual practice it will be found that more labor-saving appliances can be used on a portable plant than on a stationary plant, and, every man employed being in full view of the foreman, better results can be obtained.

INDIANAPOLIS MUNICIPAL ASPHALT PLANT.

The municipal asphalt repair department of Indianapolis, Indiana, began work for the year 1913 on January 2, and from that time to November 25 the department turned out 16,792 boxes of surface mixture and 694 boxes of cushion. Repairs on some of the streets were very thick and very extensive. On streets out of guarantee there were laid 84,265 square yards of surface, and 10,747 square yards were laid for public service corporations, contractors, plumbers, or as private repairs, making a total of 95,012 square yards of surface laid, or an average of 5.4 square yards per box.

The appropriation to the street repair asphalt account fund for purchasing materials and supplies was $40,000, and $35,000 was appropriated for salaries and wages, all of which was used, except a balance of $26.76. On January 1, 1913, there were on hand materials, tools, etc., amounting to $6,835, and on January 1, 1914, this item was $11,178, giving a total cost of work done of $70,630, or 74.4 cents per square yard. If $10,660, which was charged for work done other than city work, be deducted from the total expenditures and there be added 10 per cent of the original cost of the plant as depreciation, and the difference be divided by the total amount of city work, we have a cost of this last of 65.2 cents per square yard. This is larger than would have been the cost had there not been a large amount of repairs requiring from 2 to 5 inches of surface mixture.



WINNIPEG'S PORTABLE ASPHALT PLANT.

SPOKANE BITUMINOUS TOP PAVEMENT.

During 1913 the municipal asphalt plant of Spokane, Wash., laid 60,734 square yards of bituminous top pavement on a concrete foundation which was done by contract. The city specifications cover two thicknesses of top surface: 3 inches after ultimate compression, known as No. 1, and 2 inches, known as No. 2. Otherwise the pavements are the same. The specifications for the asphaltic cement cover penetration, solubility in carbon bisulphide, and other standard tests. Those for the construction are as follows:

PAINT COAT:

2. Upon the surface of the foundation of Portland cement concrete a paint coat shall be applied to bind or tie the surface coat to the foundation. For this purpose the surface of the cement concrete shall in its preparation be well tamped and finished with as regular and uniform a surface as possible, with no depressions exceeding one-half (½) inch deep and no loose rock on the same. The surface of the cement concrete must be clean and free from dust and loose material of any kind, and must be absolutely dry. The paint used for this purpose shall consist of 62 degrees Beaume naphtha and asphaltic cement as heretofore specified. The asphaltic cement shall be dissolved while soft and warm, in naphtha, in such proportions that the resulting paint will have a glossy surface after evaporation of the latter, but at the same time can be applied so as to form as thin a coating as possible. Approximately two hundred forty (240) pounds of asphaltic cement shall be mixed with one (1) barrel of naphtha. Approximately fifty (50) gallons of this paint should cover from three hundred fifty (350) to four hundred (400) square yards of concrete surface. No more of the surface of the foundation shall be painted than can be covered with the wearing surface within five (5) hours after the application. Care shall be used to keep the paint coat clean and, should any of it become dirty, a second coating will be required.

BITUMINOUS SURFACE MIXTURE OR WEARING COURSE:

3. The surface mixture shall consist of asphaltic cement, inorganic mineral dust, sand and crushed stone. The sand shall be clean and not of uniform size, but shall be graded as follows:

Passed 200 mesh	3 to 8%
Passed 100 mesh and retained on 200 mesh	9 to 16%
Passed 80 mesh and retained on 100 mesh	9 to 16%
Passed 40 mesh and retained on 80 mesh	25 to 45%
Passed 10 mesh and retained on 40 mesh	10 to 30%

Note.—This sand the same as used in sheet asphalt pavement.

The crushed rock to be used in the wearing surface shall be selected basalt, hard, and broken as nearly cubical as can practically be made, care being used to eliminate all porous and soft rock. The crushed rock shall be graded, and the sand added in such amount that the following percentages of the aggregate shall pass sieves of the following square mesh per lineal inch:

Passed 200 mesh	4 to 8%
Passed 100 mesh and retained on 200 mesh	5 to 10%
Passed 80 mesh and retained on 100 mesh	10 to 20%
Passed 40 mesh and retained on 80 mesh	15 to 30%
Passed 10 mesh and retained on 40 mesh	25 to 40%
Passed 4 mesh and retained on 10 mesh	15 to 40%
Passed 2 mesh and retained on 4 mesh	Less than 10%

Sieves to be used in the order named.

To the above mineral aggregate shall be added from seven (7) to ten (10) per cent of bituminous cement.

The proportions of the above materials, sand, stone, inorganic mineral dust and bitumen, may be varied within the limits designated above, in the discretion of the Commissioner of Public Works, and the said Commissioner of Public Works shall have the right to dictate other proportionings of the above materials outside the limits designated, and the contractor shall receive an extra price for the exact additional cost of the dictated mixture without the designated limits over the cost of a mixture that could be made within such designated limits, the Commissioner of Public Works to determine this amount of additional cost.

The item designated as inorganic mineral dust passing a No. 200 sieve within the limits named herein, includes fine sand passing a No. 200 sieve not exceeding 4 per cent to 8 per cent of the total mixture, and such 200-mesh mineral dust naturally self-contained in the refined asphalt.

The mineral aggregate and asphaltic cement shall be heated separately to about 300 degrees F. The maximum temperature of the sand at the mixers shall in no case be in excess of 375 degrees F. at the discharge pipe. The Portland cement or other inorganic mineral dust shall be mixed with the hot sand in the required proportions, and then these shall be mixed for at least one (1) minute with the asphaltic cement at the required temperature and in the proper proportions, in a suitable apparatus, so as to effect a thoroughly homogeneous mixture.

The proportion of asphaltic cement shall at all times be determined by actual weighing with scales attached to the asphaltic cement bucket.

The inorganic mineral dust, crushed stone and sand must also be weighed unless a method of gauging approved by the Commissioner of Public Works shall be used.

The contractor shall furnish every facility for the verification of all scales or measures.

The paving mixture prepared in the manner thus indicated shall be brought to the ground in carts or wagons at a temperature of not less than 250 degrees nor more than 330 degrees F. If the temperature of the air is less than 60 degrees F., the contractor must provide canvas covers for use in transit. It will then be thoroughly spread by means of hot rakes in such a manner as to give a uniform and regular grade, so that after reaching its ultimate compression it shall have a thickness as shown on the plans and required in the specifications. This depth shall be constantly tested by means of gauges. The surface shall then be compressed by a steam roller. While still warm it shall be drifted with torpedo sand and rerolled. If considered necessary, it shall be re-drifted and rolled again until thoroughly compressed. A steam roller shall be used weighing not less than two hundred and fifty (250) pounds to the inch run, the rolling being continued for not less than five (5) hours for every thousand square yards of surface. The surface of the finished pavement shall present a true and uniform surface with no rolls or depressions exceeding one-fourth (¼) inch from the true grade and cross-section of the street.

Samples of the material entering into the composition of the pavement shall be supplied to the City Engineer, when required, in suitable tin boxes and cans, and the contractor, when required, shall give to the engineer a written statement of the date and geographical source of all crude or other materials from which the refined asphaltum is made, and proportions of each; also per cent of pure bitumen contained therein. The City Engineer or his representative shall have access to all branches of the work at any time. He or his representative shall inspect the material furnished and work done upon the asphalt pavement, and have power to enforce all requirements of specifications. He shall at all times have access to the

works and laboratories of the contractors and shall have privileges to take samples from such works, or from material upon the streets as he may deem advisable or necessary for testing purposes. It shall be the duty of the contractors, when performing work under the contract, to furnish completed detailed analyses of the ingredients of the paving mixture, together with full laboratory tests, to the City Engineer, whenever requested by him to do so.

SIDEWALK, CURB AND GUTTER NOTES.

Sidewalks in Southington, Conn., composed of a base of 1-3-5 concrete and a one-inch surface of 1-2 mortar, in 4½-foot widths, cost 80 cents a lineal foot, and in 6-foot widths cost $1.20 per lineal foot. In Bayonne, N. J., flagstone 2½ inches thick and 4 feet wide cost $2.34 a square yard; concrete mixed with 3-inch concrete base and one-inch top, on a bed of 10 inches of cinders, cost $1.71 per square yard.

Concrete curbs in New Britain, Conn., are made 6 inches wide and 20 inches deep and cost 46 cents per lineal foot. In Chicago Heights, Ill., 6x18-inch concrete curbs are built on 6 inches of cinders on a 6-inch concrete foundation at a cost of 60 cents a lineal foot. In Bayonne, N. J., concrete curbs 5 inches thick, with concrete mixed 1-3-6, cost 67 cents per lineal foot. In Wellsville, Ohio, concrete curbs 6x24 inches cost 45 cents. In Fremont, Neb., concrete curbs 5x20 cost 30 cents. In Bayonne, N. J., bluestone curbs 5x16 inches set in concrete cost $1.02. In Corry, Pa., 6x24-inch sandstone curbs cost 70 cents. In Fremont, Neb., combined curbs and gutters, 5-inch curb and 13-inch gutter, cost 43 cents, and 5-inch curb and 25-inch gutter cost 60 cents. In Bayonne, N. J., combined concrete curb and gutter of 1-3-6 concrete, the curb 5 inches wide, gutter 16 inches wide and 7½ inches thick, cost 86 cents per lineal foot.

STREET MAINTENANCE NOTES.

Jacksonville, Fla., maintains, through its highway department, a "property yard" which takes care of all minor repairs of sidewalks and roadways and the paving of streets where concrete base or bituminous macadam surfaces are used and which are not paved under contract; also the relaying of sidewalks torn up for underground electrical construction. The plant consists of a portable concrete mixer, steam roller, stone crusher, apparatus for manufacturing sidewalk tile and a carpenter shop. The carts and horses used are owned by the department, and the materials are stored in the property yard.

Denver, Colo., repairs sheet asphalt, sandstone block, concrete, bituminous concrete and macadam pavements. For asphalt, it has a stationary plant with a capacity of 1,200 square yards of 2-inch top per day. Carthage, N. Y., owns its own quarry and stone crusher, a road roller and other street tools, and the village repairs most of the bituminous and water-bound macadam by force account.

Moline, Ill., in repairing asphalt, uses a ready mixed surface mixture and a pan for heating the same.

Montreal, Quebec, has four asphalt repair plants, three stationary and one portable, and with these and other necessary tools does all of its street repairing.

Paris, Tex., expects to purchase an asphalt repair plant this year, as some of its guarantees expire then.

Savannah, Ga., repaired 12,635 square yards of brick pavement last year by turning over the brick. This was done where the surface was irregular owing to uneven wear of brick and not to settlement. The labor cost was 23 cents a square yard, and 10 cents a square yard was spent for new brick. This has proved very satisfactory and it is proposed to do more of it this year. The brick which was turned had been down from eight to eleven years and had been laid on a natural sand foundation, which was found not to have settled appreciably. (See Municipal Journal for December 15, 1909.)

McKees Rocks, Pa., relaid 16,300 square yards of brick pavement, turning the brick over; and the same was done by Wilmerding, Pa., for 3,000 square yards. Hammond, Ind., relaid a small amount of old brick last year, the report not stating whether or not this was turned.

Macon, Ga., repairs its brick pavements with concrete, for which purpose it has its own mixer.

New Bedford, Mass., relaid 7,582 square yards of old granite block last year.

CONCRETE PAVEMENTS.

In collecting figures for the amount of paving of various kinds done in the United States last year we requested the Association of Portland Cement Manufacturers (as well as the representatives of brick, wood block and other paving industries) to send us what figures they could of roadway paving done in the various cities in 1913; and from the figures and information furnished by them we have prepared the following synopsis:

An effort was made to classify the various pavements into those constructed as one-course work, as two-course work and those of bituminous top. One-course pavements were reported to the extent of 1,242,750 square yards; and two-course pavements to the amount of 516,820 square yards. Pavements with bituminous top were apparently in almost all cases one-course concrete, although two cities apparently used two-course concrete as a foundation for such top. The total amount of concrete pavement with bituminous top reported was 739,490 square yards.

There appear to be no geographical preferences for one-course or two-course work or for bituminous top. One-course pavements were reported from Arkansas, Connecticut, Delaware, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Massachusetts, Michigan, Minnesota, Missouri, New Jersey, New York, Ohio, Pennsylvania, South Dakota, Tennessee, Virginia, Washington, West Virginia and Wisconsin. Two-course pavements were reported from Alabama, Connecticut, Delaware, Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Texas, Utah, Washington and Wisconsin. Bituminous top were reported in Alabama, Arizona, Arkansas, Maine, Michigan, Mississippi, Missouri, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Tennessee, Texas, Washington and Wyoming.

As to the thickness of one-course pavements, the yardages of the several thicknesses reported were as follows: 5-inch, 66,600; 6-inch, 584,570; 5 to 7-inch, 51,600; 7-inch, 86,900; 6 to 8-inch, 360,500; 8-inch, 59,000; thicknesses not reported, 33,600.

Of two-course pavements, the thicknesses of the bottom and top courses, respectively, were as follows: 3½ and 1½ inches, 8,800; 4 and 2, 426,540; 4½ and 1½, 87,900; 5 and 1, 9,300; 5 and 1½, 18,870; 5 and 2, 70,460; 5½ and 1½, 4,700; 5¾ and 1¾, 35,000; 6 and 1, 150; 6 and 2, 22,600; 6¾ and 1¾, 19,900. Thicknesses not reported, 112,600.

Of the concrete used for bituminous top pavements, we find one instance of 6,800 yards of 4-inch, 208,350 yards of 5-inch, 213,240 yards of 6-inch and 311,100 yards thickness not reported.

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MARCH 5, 1914.

CONTENTS

Municipal Asphalt Plant of Manhattan Borough. (Illustrated.) By D. B. Goodsell..... 297
Portable vs. Stationary Asphalt Plants. (Illustrated.) By J. W. Astley..... 299
Indianapolis Municipal Asphalt Plant..... 300
Spokane Bituminous Top Pavement..... 301
Sidewalk, Curb and Gutter Notes..... 302
Street Maintenance Notes..... 302
Concrete Pavements..... 302
Fairness in Contracts..... 303
Limiting Weight of Vehicles..... 303
Dust Laying in Clinton..... 304
Lowa's New Paving Law..... 304
Street Paving Statistics—Tables..... 304
Paving Notes for 1913..... 321
Severity Factors in Traffic Census..... 330
Difficulties with a Ground Water Supply..... 330
Cost of Water Mains..... 330
Municipal News. (Illustrated.)..... 331
Legal News—Notes of Recent Decisions..... 337
News of the Societies..... 338
Personals..... 339
New Appliances. (Illustrated.)..... 340
Industrial News..... 344
Contract News..... 345

Fairness in Contracts.

We recently expressed an opinion of the unfairness to contractors of too many municipal contracts, and a paving contract which we have just examined serves as a further illustration of the point; also of the use of irrational units.

This contract in the first place requires that proposals be made on the basis of the square yard of finished work, including not only grading, ballasting and paving, but also special work under and around the ties of railroad tracks in connection with the foundation, the curb, the removal of "all obstructions such as trees, stones, blocks, etc." The only way in which the contractor could bid on work of this kind by the square yard is to estimate first the entire cost of the work and then divide this by the total area of pavement proper, running the risk of not only erroneous calculations but also of false assumptions or guesses as to the amount of trees, stones, etc., to be removed and the relative proportions of curb and special track foundation work to pavement proper, with the disadvantage that an error either way is against him, in that it either causes him to bid too low and thus lose money or to bid too high and probably fail to get the contract. This uncertainty is increased by the fact that the street railroad is to be given the opportunity of paving in the track area if it desires, but otherwise this work shall be done by the contractor.

Care is taken to specify that the city shall not be liable in any manner to the contractor for any damage to him or loss due to any rock, water, sand, or any other unforeseen construction or material which he may come across in the work. Also that the city is not to be liable for any extras of any kind or nature unless these are ordered in writing. The city reserves the right to increase or decrease any part of the work indefinitely; also places on the contractor any loss which he may sustain owing to delay forced upon him by any cause whatsoever, not even allowing an extension of the time of his contract unless he immediately give notice to the city in writing of the cause of the delay. Finally, payment for the contract is to be made in special assessment certificates which the contractor is to receive in payment for the contract at their face value. Even if there were no other loss to the contractor, he is required to leave with the city a bond in the sum of 40 per cent. of the contract price, the interest on which sum he loses directly or indirectly.

With all these risks forced upon the contractor apparently the only opportunity left open for a loss to the city is by the failure of the pavement, the contractor not being under a maintenance bond. The specifications are good, and if the work is in charge of an engineer and inspector who know their business the city will probably obtain a good job. If the work moves along without any unforeseen difficulties, if the quantities constructed are approximately those indicated on the plans, and if the engineer and inspector are reasonable and men of experience and common sense, and if the contractor has figured correctly and allowed for a fair profit in making a bid, then the chances are that both he and the city will be satisfied with their contract. But, if any of the conditions above named should develop otherwise during the construction, then the contractor is very apt to be a loser, and the only loser—unless he can take it out of the city without their knowledge; and contractors are only human—most of them very much so.

Limiting Weights of Vehicles.

In an address before a motor truck club last month Dr. L. I. Hewes, chief of the Bureau of Economics in the United States Office of Public Roads, stated that about $1,700,000,000 had been spent on roads in this country during the last ten years, $160,000,000 through state aid alone in building some 25,000 miles of roads. He also stated that the motor vehicle license fees collected in the United States last year amounted to more than $6,000,000, and that those collected in Massachusetts almost met the entire cost of state highway maintenance.

With so much of the wealth of the country going into road and street paving, there certainly should be a determined and systematic effort to prevent unnecessarily rapid deterioration or destruction; and among the conditions to be controlled are the weight and speed of heavy motor vehicles. Dr. Hewes stated that there was very general unanimity of opinion among authorities in England and the European continent and also in America that the maximum weight per axle should be 8,000 pounds, the maximum weight per inch of tire width 800 pounds and the maximum speed of heavy trucks about fifteen miles an hour. These limitations are now embodied in a law in the state of Massachusetts, and are being enforced as a regulation in one or more other states.

DUST LAYING IN CLINTON.

During the year 1913 the town of Clinton, Mass., tried three methods of laying dust—Tarvia B, No. 6 Asphalt Road Oil, and water. A report by the superintendent shows that the treating of 50,152 square yards of roadway with Tarvia B cost $1,629.24 for tar, $48 for sand, $78.40 for freight and use of siding, and $410.60 for labor and teams—a total of $2,166.24, or 4.3 cents per square yard.

Treating 26,269 square yards with Standard Oil Company's No. 6 Asphalt Road Oil cost $461.03 for 6,147 gallons of oil, $7.00 for coal and wood, $10.75 for sand, and $254.85 for labor and teams—a total of $733.63, or 2.8 cents per square yard.

Sprinkling with water 27,518 square yards cost $820 for teaming and $25 allowed for interest and depreciation on the carts, $160 for water, $29.75 for painting and repairs, and $3.00 miscellaneous—a total of $1,037.75, or 3.8 cents per square yard.

The Tarvia was applied cold under pressure, a little less than one-half gallon per square yard being used. A thin layer of sharp sand was spread over it and traffic immediately permitted. "A good surface was produced by this material, which in a few weeks became hard enough so that a street sweeper could be used to good advantage, removing nothing but superfluous material." All the streets thus treated were of good macadam construction and were thoroughly cleaned before the material was applied. The commissioners state that they consider that the wearing quality secured amply justified the greater cost.

The No. 6 oil, which contains 60 per cent apshalt, was applied hot and covered with a thin layer of sand. "It should have been applied one-third of a gallon to the yard, but apparently a little less than one-fourth gallon was used." Most of the streets so treated gave fairly good results, but where there was considerable traffic it did not last out the season and another application of lighter oil was applied cold and not sanded.

In the opinion of the commissioners water was the least satisfactory treatment. "It adds nothing to the wearing surface of the road and even with the most careful application the streets are at times either dusty or muddy." The sprinkling cart was operated 164 days, distributing 2,369,000 gallons of water, an average of 14,445 gallons per day, and representing a little over 24 loads of water each day.

The cost of treatment was assessed against the abutting property, exempting that which was unimproved vacant land. A uniform rate of 4⅛ cents was established on all streets treated except one street of greater width where the rate was 8 cents.

IOWA'S NEW PAVING LAW.

By FLOYD F. MILES.

A new law regulating the assessing of cost of street paving went into effect in Iowa on January 1 of this year, which has aroused state wide criticism and opposition, and which will probably give rise to much litigation. This law is as follows:

Section 1. Assessing Cost of Improvements. Whenever after January 1, 1914, any city or town council, including the council of cities acting under special charter, levies any special assessment for street improvement as provided by section seven hundred ninety-two (792) of the code and amendments thereto and supplementary thereof, the same shall be made in accordance with the provisions of section seven hundred ninety-two "a" (792-a) of the supplement to the code, 1907, and shall be limited to the amount to be assessed against private property, against all lots and parcels of land according to area so as to include one-half of the privately owned property between the street improved and the next street, whether such privately owned property abut upon said street or not, but in no case shall privately owned property situated more than three hundred (300) feet from the street so improved be so assessed. In case of improvement upon any alley, such assessment shall be confined according to area to privately owned property within the block or blocks improved and if not platted into blocks for not more than one hundred and fifty (150) feet from such improved alley.

Attorney General George Cosson advises action in the courts, immediately. He points out that if a case is begun now it will be considered by the Supreme Court at the March term and an opinion handed down in April. This he says would permit cities to let contracts that could be fulfilled before the cold weather. Cities that desire an early start may have all contracts ready to sign by April, so that the test of the law will not force delay, he suggests.

City officials of Ottumwa recently conferred with the attorney general. It is probable that they will take the initiative. Superintendents of streets in every city in Iowa say property owners are restless. They believe improvements will be retarded unless the many baffling questions in the new statute are settled.

Councilman Myerly of Des Moines says the city will face a number of suits when assessments are made against property that does not abut proposed improvements. He will urge the property owners to go into the courts. The law is unfair in his opinion.

STREET PAVING STATISTICS

Official Figures from About Seven Hundred Cities — Amount of Each Kind of Street and Sidewalk Paving Done During 1913—Amount of Work Contemplated for 1914.

As has become our established practice, we present in this, the first March issue, statistics of the amount of paving work done last year in American cities, and of that contemplated for 1914. These tables are based on returns from about 700 cities and towns—a larger number than we have ever before been able to obtain. We believe that no agency, private or governmental, has ever before collected so extensive a set of figures concerning street paving.

In addition to this, the figures are believed to be reliable. They were obtained from city engineers or paving officials (with a few exceptions referred to later) in direct response to our request and for this particular purpose, and the figures so furnished were transferred directly to the printer's copy. In this mass of figures it would be almost impossible to avoid some mistakes, but we believe that these are very few and will esteem it a favor if anyone who discovers such will notify us of it that we may publish the correction in later addenda.

A few of the figures in table No. 1 were furnished by dealers in paving materials and associations of dealers or manufacturers, these all being indicated by the letter "w." The figures submitted by such dealers and associations were used only in the case of cities whose officials had not sent any figures at our request; as the opportunity of these informants to obtain exact information was not so good as that of the city officials, figures fur-

(*Continued on page* 315.)

PAVING STATISTICS OF AMERICAN CITIES.

Official Figures from Cities, Giving Work Done in 1913 and Contemplated for 1914.

TABLE NO. 1.—NEW PAVING DONE DURING 1913.

City.	Sheet asphalt.	Asphalt block.	Granite, sandstone or other stone block.	Brick or clay block.	Creosoted wood block.	Concrete.	Bitulithic.	Bituminous Concrete.	Bituminous Macadam.	Plain or water-bound Macadam.	Gravel.	Other kinds.	Repairing done by city with its own force.	Kind of repair plant used by city.
Alabama:														
Birmingham	39,520C	.....	21,456C	6.740C	36,882C	33,997C	30,757C	24,357C	7,962C	33,396Ca	.....	.....	Plain macadam.	None.
Dothan	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5	Brick.	.....
Gadsden	.....	.....	.....	.....	.....	.....	.....	6,000C	.....	.....	100,000M	.....	.....	.....
Selma	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	16,000b	.....	.....
Arizona:														
Bisbee	.....	.....	.....	1,500C	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Phoenix	.....	.....	.....	.....	.....	.....	70,000	.....	.....	.....	.....	.....	.....	.....
Arkansas:														
Fort Smith	.....	.....	.....	74,028	.....	116,071	.....	.....	4,000	.....	.....	.....	Brick.	None.
Helena	.....	.....	.....	11,800w	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Little Rock	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	28,000bw	.....	.....
Marianna	.....	.....	.....	.....	.....	.....	.....	.....	.....	17,600M	.....	.....	Macadam.	None.
Pine Bluff	.....	.....	.....	.....	30,000C	.....	.....	52,000C	.....	.....	.....	9,000Cb	All kinds.	None.
California:														
Anaheim	34,500C	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Los Angeles	27.8C	.....	.....	0.68C	.....	2.6C	2.0C	.....	.....	3.3C	24.6C	.....	Patches only.	.....
Modesto	.....	.....	.....	.....	.....	.....	.....	32,960	.....	.....	.....	.....	.....	.....
Oakland	103,050C	.....	.....	.....	.....	.....	.....	.....	.....	4,010C	.....	253,425Cc	Surface oiling.	Oiling outfit.
Ontario	.....	.....	.....	.....	.....	32,853	.....	.....	.....	.....	.....	18.0x	.....	.....
Oxnard	.....	.....	.....	.....	.....	.....	.....	.....	1,410	.....	.....	.....	.....	.....
Richmond	.....	.....	.....	.....	.....	.....	11,756C	.....	.....	.....	.....	62,490Cc	Oil macadam.	.....
Santa Ana	41,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Santa Barbara	14,550C	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Colorado:														
Colorado Springs	.....	.....	.....	.....	.....	.....	.....	.....	39,950C	.....	.....	.....	.....	Hand plant.
Denver	.....	.....	12,657C	4,200w	.....	54,192C	.....	40,881C	.....	96,000C	.....	.....	All kinds.	Stationary, cap. 1,200 sq. yds 2" top.
Grand Junction	.....	.....	.....	.....	.....	.....	.....	.....	15,000M	.....	.....	.....	Asphalt & concrete.	Heater and roller.
Longmont	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10,000	.....	.....	.....
Connecticut:														
Ansonia	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bridgeport	.....	.....	6,801C	.....	44,349C	1,450C	.....	44,423C	.....	.....	.....	.....	All.	Tar kettle.
Danbury	.....	.....	.....	.....	.....	.....	.....	.....	22,700	750	.....	.....	.....	.....
Derby	.....	.....	1,300C	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
E. Hartford	.....	.....	.....	.....	.....	.....	.....	.....	.....	7,000	.....	.....	.....	.....
Greenwich	.....	.....	.....	.....	.....	12,000C	.....	.....	.....	.....	.....	2,750d	.....	.....
Hartford	9,933C	.....	1,766C	.....	.....	0.25	.....	1	.....	.....	.....	.....	.....	.....
Killingly	.....	.....	.....	.....	.....	.....	.....	.....	.....	6,840M	.....	.....	.....	.....
Meriden	.....	.....	.....	.....	.....	.....	.....	.....	.....	48,387M	.....	.....	.....	.....
Middletown	.....	.....	.....	.....	.....	11,100w	.....	.....	.....	.....	.....	35,098dw	.....	.....
New Britain	.....	.....	.....	9,665C	7,659C	.....	.....	.....	.....	.....	.....	15,633d	.....	.....
New Haven	60,850C	.....	.....	.....	46,753Ce	.....	.....	.....	84,894C	.....	.....	.....	All kinds.	Portable hand plant
Plymouth	.....	.....	.....	.....	.....	5,600w	.....	.....	.....	.....	.....	.....	.....	.....
Putnam	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,000Cd	.....	.....
Southington	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	0.5	.....	.....	.....
S. Norwalk	.....	.....	.....	.....	16,167w	.....	.....	.....	.....	.....	.....	.....	.....	.....
Stamford	.....	.....	.....	.....	.....	7,000w	.....	.....	.....	.....	.....	.....	.....	.....
Wallingford	.....	.....	.....	9,276C	.....	6,222C	.....	.....	25,000C	.....	.....	13,302Cf	.....	.....
Westport	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3,920dw	.....	.....
West Hartford	.....	.....	.....	.....	.....	10,100w	.....	.....	.....	.....	.....	.....	.....	.....
Windsor	.....	.....	.....	.....	.....	23,000w	.....	.....	.....	.....	.....	.....	.....	.....
Delaware:														
Delaware City	.....	.....	.....	.....	.....	12,000w	.....	.....	.....	.....	.....	.....	.....	.....
Georgetown	.....	.....	.....	.....	.....	2,000w	.....	.....	.....	.....	.....	.....	.....	.....
Wilmington	.....	.....	.....	1,330M	.....	.....	9,077M	956M	1,598M	1,583M	.....	.....	.....	.....
Dist. Columbia:	20,800C	6,135C	.....	.....	.....	13,066C	.....	7,312C	.....	35,234MC	.....	.....	All minor repairs.	700 cu. ft. plant.

For footnotes, see page 315.

TABLE NO. 1.—NEW PAVING DONE DURING 1913. (Continued.)

City.	Sheet asphalt.	Asphalt block.	Granite sandstone or other stone block.	Brick or clay block.	Creosoted wood block.	Concrete.	Bitulithic.	Bituminous Concrete.	Bituminous Macadam.	Plain or water-bound Macadam.	Gravel.	Other kinds.	Repairing done by city with its own force.	Kind of repair plant used by city.
Florida:														
Clearwater				38,709		8,178								
Gainesville				65,000C										
Jacksonville				69,183C				6,350M				2,400Mb		
Pensacola						22,000w								
Sarasota				22,000C									All.	
Georgia:														
Athens			1,170M	13,486M		27,608M				4,600M				
Atlanta			22,613M	66,994C	29,914C	17,085C	73,223MC		123,033MC	118,622MC			All.	Smith hot mixer.
Brunswick				6,000C										
Macon				57,805C		24,298C							Repair brick with concrete.	Concrete mixer.
Savannah		20,391M	715M								2,000M		All.	Smith hot mixer.
Idaho:														
Moscow												71,558b		
Pocatello							70,510C							
Illinois:														
Aurora	80,166		9,620											
Bloomfield						9,000w								
Bloomington				63,506C									All brick pavement.	
Canton				22,000C									All brick pavement.	
Carrollton				40,000										
Casey				6,780										
Chicago	671,772MC		30,585MC	340,969MC	202,416MC	71,348M C		165,496MC	218,007MC	17,085MC			All.	H & B for asphalt.
Chicago Heights				57,555										
Edwardsville						31,900w						1,200bw		
Elgin				24,544C				11,355C						
Galesburg				42,298C									All.	
Galva				4,300C										
Granite City				6,000C	11,050C				14,944C					
Greenville				7,500C										
Harvey				158,400										
Joliet						6,680w								
Jacksonville						2,150w								
Jerseyville				27,000C										
Kankakee				9,000C										
Lake Forest								10,000C	11,000C				Macadam and tar-via surface.	Tar kettle.
Moline				25,500C									Asphalt and brick.	Asphalt pan.
Momence				2,458C					9,992C	8,078C				
Monmouth				18,000C							1,000M			
Murphysboro				5,000C										
Normal				15,000C										
Oak Park				15,965C				52,529C					Macadam.	
Paris											0.25	1		
Pekin				62,367C										
Prophetstown				9,000C										
Quincy						1,500w								
Riverside						560w								
Rockford				1.98C		0.06C				2.54MC			Macadam & brick.	
Springfield				38,296C										
Taylorville				3,039C										
Waukegan			570C	21,333C					1,000M				Brick & bit. macadam.	
Woodstock						70,000C								
Indiana:														
Anderson												1,800b		
Bedford										2.5			All.	
Bloomington				3,000C						2,000C			Macadam.	
Bluffton										6.0			All.	Asphalt plant.
Fort Wayne	68,946C			47,250C				30,326C				0.45Cg		
Frankfort				21,393C							37,550C	2,700	Brick.	
Gary				52,954C					12,828C	105,842C				
Goshen				19,110								10,000vw		
Greencastle				300C										
Hammond						771C			57,703C	0.76C		19,000vw		
Huntington												11,000vw		
Lafayette						387					11,715			

La Porte										3,000C			Macadam.	Steam roller, etc.	
Mishawaka	27,000C						6,989C								
Muncie				10,478C	15,896C								Patching only.		
New Castle				20,000C							5,000C				
North Vernon						500M				1M					
Portland				8,211C									Gravel only.		
Richmond				20,300		7,600w									
Seymour						35,000w									
South Bend				42,343C		9,755C		9,205C			6,098C				
Terre Haute				2.43		0.47	1.0				0.36	10,500vw			
Washington											23,760				
Whiting												19,000vw			
Iowa:															
Algona								20,000C							
Ames						10,500w									
Bloomfield						2,300C		24,590C				1.5c			
Burlington				2,353C	0.62C	50,206C		11,082C				8,401b	Brick.		
Cedar Rapids				42,000C	5,675C	12,232C		8,058C							
Clinton				54,012C								27,362Cb			
Corning				22,000C											
Council Bluffs						650w									
Davenport	6,070C			33,220C		32,218C							All repair.	Stationary asphalt plant.	
Des Moines	91,270			21,580		50,786	83,745								
Dubuque						2,560w									
Fort Dodge								37,633C			6,000M		Brick & wood block		
Fort Madison				28,000C											
Iowa City				7,500C			36,000C								
Iowa Falls						20,100w									
Knoxville						20,000w		18,000C							
Manchester											2,200M				
Mason City						25,300									
Muscatine				5,017C		11,155C	24,056C								
Newton					70,000C								All.		
Oskaloosa				3,966C									All.		
Perry						5,000									
Red Oak					139w										
Sioux City				1,800C		120,000C							Asphalt & concrete.	Stat. asph. plant.	
Vinton						16,500w									
Winterset				1,240C											
Kansas:															
Abilene								28,009C							
Arkansas City	55,960C														
Atchison				9,465w		6,200w									
Chanute				8,100C											
Coffeyville				7,000C									Brick.		
Dodge City				12,800w											
Fort Scott				28,510C		400C							Brick.		
Girard				6,500w											
Hutchison				10,000C	400C										
Independence				4,200w											
Iola				3,490w											
Junction City				24,440C		6,650C		21,295C				1,375b			
Kansas City	13,541			13,590		76,482	19,754	3,713	5,686						
Leavenworth				21,639C											
McPherson								20,000							
Manhattan				4,200				45,000C							
Marion				9,566w											
Newton						5,000w									
Olathe				1,600C		900C									
Ottawa				5,400C											
Paola				5,060w											
Parsons				16,000C				15,500C		3,400C					
Pittsburg				57,756		6,055									
Rosedale				7,137w											
Topeka				56,000C				58,000C					Asphalt.	Small station. plant	
Wichita	10,284			45,250h		482			25,929				All, but asphalt.		
Winfield				8,000w											

For footnotes, see page 815.

TABLE NO. 1.—NEW PAVING DONE DURING 1913. (Continued.)

City.	Sheet asphalt.	Asphalt block.	Granite sandstone or other stone block.	Brick or clay block.	Creosoted wood block.	Concrete.	Bitulithic.	Bituminous Concrete.	Bituminous Macadam.	Plain or water-bound Macadam.	Gravel.	Other kinds.	Repairing done by city with its own force.	Kind of repair plant used by city.
Kentucky:														
Dayton	.....	.....	.....	2,000C	.....	.....	.....	.....	1,500C	3,000C	.....	.....	.....	.....
Highland	.....	.....	.....	.....	.....	.....	.....	.....	6,500	.....	.....	.....	.....	.....
Hopkinsville	.....	.....	.....	.....	.....	.....	.....	.....	.....	2.0M	.....	.....	.....	.....
Lexington	79,200C	.....	.....	1,200C	.....	.....	.....	.....	2,500C	.....	.....	.....	.....	.....
Morganfield	.....	.....	.....	1C	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Newport	11,608C	.....	.....	27,244C	455C	.....	.....	.....	.....	.....	.....	.....	.....	.....
Winchester	.....	.....	.....	20,000C	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Louisiana:														
Lake Charles	.....	.....	.....	63,953w	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Shreveport	.....	.....	.....	19,086w	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Maine:														
Bangor	.....	.....	.....	.....	6,511	1,000	.....	.....	1,500	10,000	25,000	.....	.....	.....
Calais	.....	.....	.....	.....	.....	.....	.....	.....	2,830M	.....	.....	.....	.....	.....
Lewiston	.....	.....	.....	.....	.....	.....	.....	2,909M	11,013M	.....	.....	.....	.....	.....
Portland	.....	.....	4,028M	.....	.....	.....	.....	.....	641M	.....	.....	16,916Cb	Bit. & granite block	.....
Maryland:														
Baltimore	213,588C	.....	103,659C	177,349C	6,674C	.....	.....	62,597C	.....	.....	.....	.....	.....	.....
Hagerstown	.....	.....	.....	15,221M	.....	.....	.....	.....	.....	.....	.....	.....	All.	.....
Pocomoke City	.....	.....	.....	.....	.....	1.5C	.....	.....	.....	.....	.....	.....	.....	.....
Westminster	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,556M	.....	.....	All.	.....
Massachusetts:														
Adams	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5,400M	10,000Mg	.....	.....
Andover	.....	.....	.....	.....	.....	.....	.....	.....	5,700M	.....	.....	.....	Gravel.	.....
Boston	2,935C	.....	848C	1,235C	38,077C	.....	24,398C	.....	74,433C	6,713C	.....	.....	Macadam.	None.
Brookline	.....	.....	.....	.....	.....	.....	.....	.....	5,600	.....	.....	.....	.....	.....
Cambridge	.....	.....	12,675M	.....	9,840M	.....	24,226M	.....	20,977M	.....	.....	.....	.....	.....
Chicopee	.....	.....	.....	.....	1,700w	.....	.....	.....	.....	.....	.....	.....	.....	.....
Everet	.....	.....	4,176M	.....	.....	.....	.....	.....	1.28M	.....	.....	.....	.....	.....
Fall River	.....	.....	265M	.....	.....	.....	.....	.....	5,675M	26,625M	.....	.....	Stone block & macadam.	.....
Fitchburg	.....	.....	.....	.....	9,100w	.....	.....	.....	.....	.....	.....	.....	.....	.....
Haverhill	.....	.....	.....	.....	.....	.....	.....	.....	31,988M	.....	30,482M	.....	.....	.....
Lawrence	.....	.....	73,890M	.....	.....	.....	.....	.....	.....	9,996	.....	.....	All.	.....
Lowell	.....	.....	25,746M	.....	.....	1,980M	.....	.....	29,510M	642M	44,033M	.....	.....	.....
Lynn	.....	.....	13,452M	.....	.....	32,430M	.....	.....	.....	.....	.....	.....	.....	.....
Medford	.....	.....	.....	.....	.....	.....	.....	.....	4,667M	.....	.....	.....	All.	.....
New Bedford	.....	.....	8,307C	.....	.....	.....	25,833C	.....	1,653M	54,188M	.....	.....	Macadam.	4 crushers & rollers.
Somerville	.....	.....	850C	.....	.....	.....	.....	.....	0.98M	.....	.....	8,410CMb	All except asph. & patented pavem'ts.	.....
Southbridge	.....	.....	.....	5,000C	.....	.....	.....	.....	6,000C	.....	8,000C	.....	.....	.....
Springfield	.....	.....	6,246M	1,696M	26,899M	9,195C	18,477C	.....	129,231M	14,390M	7,666M	.....	All but bitulithic.	Semi-portable plant
Waltham	.....	.....	.....	.....	.....	.....	.....	.....	9,870M	1,950M	.....	.....	.....	.....
Webster	.....	.....	.....	.....	.....	.....	.....	.....	1,244M	9,867M	3,409M	.....	.....	.....
Woburn	.....	.....	.....	.....	.....	.....	.....	.....	11,176C	.....	.....	.....	.....	.....
Worcester	.....	.....	16,278M	.....	.....	7,635M	.....	.....	30,858M	61,896M	22,433M	.....	.....	.....
Michigan:														
Alpena	.....	.....	.....	.....	.....	11,488	.....	.....	.....	.....	.....	.....	.....	.....
Ann Arbor	.....	.....	.....	.....	.....	33,463M	.....	.....	.....	.....	.....	.....	All.	Concrete plant.
Battle Creek	.....	.....	.....	26,300M	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bay City	30,519C	.....	.....	25,816C	.....	11,249C	.....	.....	.....	.....	.....	.....	Brick.	Hot wagon, steam roller, etc.
Benton Harbor	.....	.....	.....	2,600C	.....	.....	.....	23,000C	.....	.....	.....	.....	.....	.....
Cadillac	.....	.....	.....	.....	.....	8,000w	.....	.....	.....	.....	.....	.....	.....	.....
Caro	.....	.....	.....	.....	.....	12,000w	.....	.....	.....	.....	.....	.....	.....	.....
Colomo	.....	.....	.....	7,960C	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Detroit	36,602C	.....	.....	43,713C	265,836Ci	106,007C	.....	.....	.....	.....	.....	.....	All resurfacing and asphalt top.	.....
East Lansing	.....	.....	.....	.....	.....	10,700w	.....	.....	.....	.....	.....	.....	.....	.....
Grand Rapids	.....	0.37	.....	1.92	.....	0.52	.....	1.27	.....	0.28	5.17	2,000rw	.....	.....
Grand Haven	.....	.....	.....	.....	.....	23,300w	.....	.....	.....	.....	.....	.....	.....	.....
Hamtramck	.....	.....	.....	.....	12,125C	31,771C	.....	.....	.....	.....	.....	.....	.....	.....
Hastings	.....	.....	.....	.....	.....	18,000w	.....	.....	.....	.....	.....	.....	.....	.....
Holland	.....	.....	.....	5,000	.....	.....	.....	5,000	.....	.....	.....	.....	.....	.....
Kalamazoo	.....	.....	.....	2,455C	.....	931C	.....	45,075C	.....	.....	.....	.....	Brick & concrete.	.....
Lansing	.....	.....	.....	.....	.....	6,900M	.....	24,381M	.....	.....	.....	.....	All.	Rapid mixers.
Mt. Pleasant	.....	.....	.....	.....	.....	1,800w	.....	.....	.....	.....	.....	.....	.....	.....
Pontiac	.....	.....	.....	.....	.....	.....	.....	37,600C	.....	.....	.....	.....	Brick.	.....

Saginaw	32,294C			990C	889C								Asphalt and brick.	Two Rapid mixers.
Sturgis				5,000C										
St. Johns						5,000w								
So. Haven						11,000w								
Minnesota:														
Bemidji						12,620								
Brainerd						17,600w								
Chisholm					26,200M									
Crookston									10,000C			10,000rw		
Duluth	24,400C		3,871C	5,146C	10,229C	654C			31,211C		215C		Tar macadam, asphalt & telford.	Asphalt mixer.
Minneapolis				10,588M	111,363M	49,273M		15,526M					All.	Cummer plant for asph., tar kettles, etc., for other.
Poplar Bluff				60,000C										
Rochester					4,564C			15,532C						
St. Paul			8,690	26,972	68,724	879							All.	One 400 & 1 1,500 sq. yd. asphalt plant.
Stillwater						2,687C				0.75M				
Winona				7,977C	5,790C									
Mississippi:														
Hattiesburg											8,000M	8,000		
Jackson												7,000bw		
Meridian											27,930	31,240b		
West Point											20,300C		Gravel & macadam.	
Missouri:														
Aurora											10			
Boonville				22,392C		6,500C							All.	
Butler				1C										
Cape Girardeau						30,000C						9,418Cb		
Chillicothe				1,675w		7,000w								
Clinton						13,000C								
Columbia				5,433C		11,866C								
De Soto										12,110				
Fulton				1,500C										
Hannibal						2,500C			22,000C					
Holmes					178w									
Jefferson									35,000C				Patching.	Portable plant.
Joplin				2,175C	360w			44,139C		34,791		10,000rw		
Kansas City				75,000w	3,020w	26,800w								
Kirksville				3,476C		31,564C								
Kirkwood										23,467C			Macadam & gravel.	
Lexington				8,415w										
Maplewood						4,000w						1,750bw		
Marshall												13,500bw		
Mexico	9,522C													
Nevada											1,000	30,000b		
Palmyra											10,000M			
Richmond				5,113C		7,200C								
St. Joseph				2,136w								7,400Cb	Sheet asphalt.	
Sedalia				11,000C										
South Lea					2,129w									
Springfield						100,000w								
Trenton				1,009										
Webster Groves												26,000bw		
Montana:														
Billings					24,035C	1,150C	19,260C							
Bozeman							43,000C							
Butte				8,335C		282C	4,790C							
Great Falls						2,340C	6,227C				11,550M			
Helena				6,000						4,500				
Missoula				5,447C	241C									
Nebraska:														
Auburn				23,000w										
Beatrice				47,000C										
David City				33,933M										
Falls City				21,704w										
Fremont				22,268	2,976w									
Hastings				7,569C										
Lincoln	28,185			32,025	1,497		56,680						All.	Hooke asph. mixer.
Morse Bluff					2,250w									

For footnotes, see page 315.

TABLE NO. 1.—NEW PAVING DONE DURING 1913. (Continued.)

City.	Sheet asphalt.	Asphalt block.	Granite sandstone or other stone block.	Brick or clay block.	Creosoted wood block.	Concrete.	Bitu-lithic.	Bituminous: Concrete.	Bituminous: Macadam.	Plain or water-bound Macadam.	Gravel.	Other kinds.	Repairing done by city with its own force.	Kind of repair plant used by city.
Norfolk	.....	.....	.....	.....	.....	.....	.....	53,000C	.....	.....	.....	.....	.....	.....
Omaha	57,255C	.....	.....	30,881C	.....	11,835C	.....	2,882C	.....	3,230M	.....	.....	.....	.....
So. Omaha	.....	.....	.....	5,035C	.....	.....	.....	9,850C	.....	.....	.....	.....	.....	.....
Tekamah	.....	.....	.....	.....	186w	.....	.....	.....	.....	.....	.....	.....	.....	.....
New Hampshire:														
Berlin	.....	.....	.....	.....	.....	.....	.....	8,889	.....	10,586M	10,000M	.....	.....	.....
Laconia	.....	.....	.....	.....	.....	.....	.....	.....	6,211M	.....	.....	.....	All.	Melt'g kettle, steam roller, etc.
New Jersey:														
Bayonne	17,300	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Brick.	.....
Bloomfield	.....	.....	51,700C	.....	.....	.....	20,000C	.....	13,500C	.....	.....	.....	Telford.	.....
Camden	8,000M	.....	15,370C	900C	.....	350C	.....	.....	.....	.....	.....	.....	All.	H. and B. asph. plant 1,000-yd.
Elizabeth	.....	.....	41,700	48,960	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Glen Ridge	.....	.....	.....	.....	.....	1,534C	.....	.....	.....	2,070C	.....	.....	Telford.	.....
Hammonton	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Jersey City	.....	.....	.....	.....	1,320w	.....	.....	.....	.....	168,000C	.....	.....	.....	.....
Kearny	.....	.....	3,111	3,428	.....	.....	.....	39,629	6,921	.....	.....	.....	.....	.....
Long Branch	.....	.....	.....	24,000C	.....	.....	11,000C	.....	.....	.....	190,000M	.....	.....	.....
Madison	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	784dw	.....	.....
Metuchen	.....	.....	.....	.....	.....	.....	.....	.....	.....	4,000C	.....	3,767Cd	.....	.....
Millville	.....	.....	.....	25,000C	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Morristown	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,155dw	.....	.....
Newark	10,199C	6,362C	28,416C	46,502C	630C	.....	101,472C	.....	.....	.....	.....	.....	All.	Warren semi-portable mixing plant.
New Brunswick	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	19,000bw	.....	.....
Ocean City	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	21,000bw	.....	.....
Passaic	15,212C	.....	.....	.....	.....	.....	.....	.....	14,770C	.....	.....	.....	Macadam.	.....
Paterson	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5,000dw	.....	.....
Plainfield	.....	.....	.....	.....	.....	.....	.....	.....	.....	26,133	.....	.....	.....	.....
Ridgefield Park	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4,879dw	.....	.....
Roselle Park	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	784dw	.....	.....
Rutherford	.....	.....	.....	8,000C	.....	.....	.....	.....	5C	1C	.....	.....	.....	Auto truck sprayers
Salem	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	735dw	.....	.....
Summit	.....	.....	2,500C	.....	.....	.....	.....	.....	.....	6,100C	.....	.....	Macadam.	Tar kettle, steam roller, etc.
Trenton	20,596C	.....	4,222C	5,014C	.....	4,261C	.....	26,518C	.....	.....	.....	.....	Brick, mac. & asph.	Heating pans.
Westfield	.....	.....	.....	.....	.....	19,000C	.....	.....	.....	37,000C	.....	.....	.....	.....
West New York	.....	16,000C	19,000C	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
West Orange	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,000C	.....	.....	.....	.....
New York:														
Albany	25,640C	.....	27,835C	43,955C	7,935C	8,949C	.....	.....	.....	.....	.....	.....	.....	.....
Batavia	.....	.....	.....	.....	.....	6,300w	.....	.....	.....	.....	.....	.....	.....	.....
Binghamton	.....	.....	.....	43,279C	2,661C	2,354C	0.56C	.....	.....	.....	.....	.....	Brick.	.....
Bronxville	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	854dw	.....	.....
Buffalo	203,750C	.....	12,522C	37,107C	.....	.....	.....	.....	.....	.....	.....	.....	Brick, stone & mac.	.....
Carthage	.....	.....	.....	7,500C	.....	.....	.....	.....	20,700C	.....	.....	.....	Plain & bit. mac.	.....
Catskill	.....	.....	.....	6,300C	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cortland	.....	.....	.....	.....	.....	2,000	.....	.....	5,000	.....	.....	.....	.....	.....
Dunkirk	14,134C	.....	.....	.....	.....	3,760C	.....	.....	.....	.....	.....	.....	.....	.....
Elmira	.....	.....	.....	62,072C	1,515	.....	.....	.....	.....	.....	.....	.....	.....	.....
Fulton	.....	.....	.....	.....	.....	500	.....	.....	.....	.....	.....	.....	.....	.....
Hornell	.....	.....	.....	14,415C	.....	.....	.....	.....	.....	.....	1M	.....	Brick.	.....
Hudson	.....	.....	.....	14,000	.....	.....	.....	.....	.....	10,000	.....	.....	.....	.....
Hudson Falls	.....	.....	.....	3,600C	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Jamestown	.....	.....	.....	20,339M	.....	.....	.....	.....	.....	.....	.....	6,258Mb	All.	.....
Larchmont	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,789dw	.....	.....
La Salle	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6,400bw	.....	.....
Little Falls	.....	.....	.....	.....	.....	.....	.....	.....	3,000C	10,000M	.....	.....	All.	.....
Lockport	2,686C	.....	10,560	35,044	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Newburgh	.....	23,224C	2,239C	1,702C	.....	.....	24,576C	.....	.....	17,000M	.....	.....	.....	.....
New Rochelle	.....	.....	.....	.....	.....	13,150w	.....	.....	.....	.....	.....	14,875dw	.....	.....
Salamanca	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,560dw	.....	.....
Troy	.....	.....	.....	.....	.....	60,000w	.....	.....	.....	.....	.....	.....	.....	.....
Utica	8,030C	.....	.....	823C	.....	.....	13,232C	4,553C	11,300C	.....	.....	.....	.....	.....
New York City:														
Bronx Boro	120,338C	54,858C	87,367C	.....	648C	.....	.....	110,540C	.....	.....	.....	.....	.....	.....
Brooklyn Boro	857,338C	13,615C	180,954C	.....	16,294C	.....	.....	.....	.....	.....	.....	23,487Cy	All.	Munic. asph. plant.
Manhattan Boro	318,900C	6,700C	225,370C	.....	121,700C	.....	.....	.....	.....	.....	.....	.....	Granite.	Asph plant for 1914.
Queens Boro	40,491C	103,027C	36,808C	1,016C	46,762C	.....	.....	.....	160,028	.....	.....	.....	.....	Station. asph. plant.

Richmond			10,445MC	6,176C				3,765C	5,954C					
Niagara Falls		38,221		13,541		20,524	21,656	4,972					Sheet asphalt.	Smith hot mixer.
No. Tonawanda				8,900C				15,600C						
Ogdensburg			1,400C	30,490C				9,000C					Brick & macadam.	
Olean				31,850C										
Oneonta				8,900C					1,500C					
Peekskill					20,852w									
Plattsburg									9,247M			1,585Cb		
Port Chester				650C			5,000C							
Rochester	146,524	2,394	4,828	85,040	7,153				9,476					
Salamanca														
Schenectady	11,100C		10,000M		3,500C			50,850					Granite, cobble and macadam.	
Solvay				7,988C										
Syracuse	86,738C			26,745					3,407				Brick.	
Troy														
Utica														
Watertown					7,700C	5,000C				30,000M				Gasoline roller, tar kettles, etc.
White Plains				2,300					9,400				Resurfacing.	
North Carolina:														
Bessemer City						8,800w								
Charlotte						59,000w								
Goldsboro							16,000C				16,000M		All.	
Greensboro											15,000			
Kinston												42,240Mj		
Monroe										4,000				
Raleigh												12,000bw		
Wilmington												12,000bw		
North Dakota:														
Fargo				8,136			41,038							
Minot					12,099C						13,200C			
Williston											3C			
Ohio:														
Ada				1,400C				7,000C						
Andover						25,000w								
Ashtabula			3,700C	23,750C										
Cambridge				13,000C										
Canton				50,000C										
Cedar Point						72,800w								
Chillicothe				1,435C										
Cincinnati	19,069C		57,480C	39,425C	4,332C	271C		31,995C		24,588C			All.	Asphalt plant.
Cleveland	2,192C		9,246C	402,939C	4,943C	5,866C						2,000rw		
Clyde												9,600bw		
Columbus	63,555C			125,027C										
Coshocton				6,298C										
Dayton				59,500C	5,500C	6,000C								Smith asph. mixer.
Delaware				8,000C										
East Liverpool				12,350C										
Findlay												8,400rw	Openings in paved streets.	
Fostoria		3,327		30,478										
Fremont				20,000C						10,000C				
Galion				9,555C									All.	
Greenville				1,030C									All.	
Lakewood						4,300w								
Lima				5,418C									All.	Portable tar kettle, horse or steam roller, etc.
Lorain				1,200				53,000						
Marion				12,070										
Massillon				24,100							4M		All.	
Middlefield												10,100bw		
Newark				2.49C						1.0			Brick over pipe trenches.	
Norwalk						1,700w								
Norwood			20,000		12,000		8,000			8,000				
Painesville				33,642C							4M			
Plymouth						6,500w								
Rutland												3,300bw		
St. Marys				17,200						1.0				
Sandusky							1,200							
Scio						17,000w								
Springfield	34,000C			32,000C				16,000C	14,000	5,000C				Hooke.
Tiffin						2,600w								

For footnotes, see page 315.

TABLE NO. 1.—NEW PAVING DONE DURING 1913. (Continued.)

City.	Sheet asphalt.	Asphalt block.	Granite sandstone or other stone block.	Brick or clay block.	Creosoted wood block.	Concrete.	Bitulithic.	Bituminous: Concrete.	Bituminous: Macadam.	Plain or water-bound Macadam.	Gravel.	Other kinds.	Repairing done by city with its own force.	Kind of repair plant used by city.
Toledo	.....	.....	.....	.....	.....	26,500w	.....	.....	.....	.....	.....	.....	.....	.....
Troy	.....	.....	.....	.....	.....	2,200w	.....	.....	.....	.....	.....	.....	.....	.....
Van Wert	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	14,000vw	.....	.....
Vaughnsville	.....	.....	.....	.....	.....	7,000w	.....	.....	.....	.....	.....	.....	.....	.....
Vermillion	.....	.....	.....	.....	.....	7,000w	.....	.....	.....	.....	.....	.....	.....	.....
Wellsville	.....	.....	.....	17,600	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Willoughby	.....	.....	.....	2,753C	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown	.....	.....	.....	200,000C	930C	.....	.....	13,969C	.....	.....	.....	.....	.....	.....
Zanesville	.....	.....	.....	15,008	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Oklahoma:														
Cleveland	.....	.....	.....	4,255w	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lawton	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	43,700Ck	.....	.....
Mangum	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.0	.....	.....	.....	.....
Norman	.....	.....	.....	14,100w	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Nowata	.....	.....	.....	4,638C	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Okmulgee	.....	.....	.....	60,000C	.....	.....	.....	62,000C	.....	.....	.....	.....	.....	.....
Ponca City	.....	.....	.....	12,842	.....	625	.....	.....	.....	.....	.....	.....	.....	.....
Stillwater	.....	.....	.....	9,000w	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tulsa	45,000C	.....	.....	4.0C	.....	.....	6.0C	.....	.....	.....	.....	.....	.....	.....
Oregon:														
Astoria	.....	.....	.....	.....	.....	3,200C	.....	.....	800C	5,900C	.....	.....	.....	.....
Coquille	.....	.....	.....	.....	.....	4,000w	.....	.....	.....	.....	.....	.....	.....	.....
Eugene	.....	.....	.....	.....	.....	.....	0.56C	3.67C	.....	1,367C	.....	.....	.....	.....
Pendleton	.....	.....	.....	.....	.....	.....	40,195	.....	.....	.....	.....	.....	.....	.....
Portland	7.26C	.....	0.21C	.....	.....	18.37C	20.06C	3.90C	.....	.....	.....	.....	Macadam, brick and stone block.	None.
Pennsylvania:														
Allentown	65,780C	.....	.....	13,320C	.....	.....	.....	1.37C	.....	.....	.....	.....	.....	.....
Bethlehem	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	31,644dw	.....	.....
Bradford	.....	.....	.....	4,500C	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Carlisle	.....	.....	.....	6,700C	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Catasauqua	.....	.....	.....	.....	.....	480C	.....	2,700C	.....	.....	.....	.....	.....	.....
Chambersburg	.....	.....	.....	15,300C	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chester	.....	.....	660	.....	.....	.....	.....	148,000	.....	.....	.....	.....	.....	.....
Clairton	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	12,630Cb	.....	.....
Clarion	.....	.....	.....	.....	.....	1,600C	.....	.....	.....	.....	.....	.....	.....	.....
Columbia	.....	.....	.....	1,000M	.....	.....	.....	2,200M	25,000M	10,000M	.....	.....	.....	.....
Connellsville	.....	.....	.....	16,138	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Corry	.....	.....	.....	8,160	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Courtdale	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4,319dw	.....	.....
Donora	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4,260bw	.....	.....
Du Bois	.....	.....	.....	10,459C	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Easton	.....	.....	.....	12,328MC	.....	.....	.....	12,446C	.....	.....	.....	11,360MCl	Approximately all.	.....
Edwardsville	.....	.....	1,000C	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Emaus	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6,650dw	.....	.....
Erie	41,103	.....	.....	1,676	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Gallitzen	.....	.....	.....	5,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Greensburg	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4,130dw	.....	.....
Grove City	.....	.....	.....	12,000C	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Harrisburg	59,983C	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hazelton	.....	.....	.....	.....	.....	.....	.....	.....	.....	5.0M	3.0M	.....	All.	.....
Homestead	.....	.....	.....	1,184C	.....	.....	.....	.....	.....	.....	.....	.....	Defective places.	.....
Jenkintown	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	882dw	.....	.....
Kennett Square	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	450dw	.....	.....
Kingston	.....	.....	.....	4,000C	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lancaster	.....	16,173	29,283	114,740	.....	.....	.....	.....	61,183	787,356	.....	.....	.....	.....
Lansdowne	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	609dw	.....	.....
Larksville	.....	.....	.....	5,000C	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Luzerne	.....	.....	.....	5,500C	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
McKees Rocks	.....	.....	1,880C	23,100C	.....	.....	.....	.....	.....	.....	.....	1,078dw	Brick repaving.	.....
Media	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	7,260dw	.....	.....
Meadville	.....	.....	.....	6,696C	.....	.....	.....	.....	.....	.....	.....	.....	Maintenance & cuts.	.....
Mechanicsburg	.....	.....	.....	10,000C	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Monongehela	.....	.....	.....	28,300C	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Nazareth	.....	.....	.....	.....	.....	2,700w	.....	.....	.....	.....	.....	2,457dw	.....	.....
Newport	.....	.....	.....	2,000C	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Norristown	.....	.....	.....	M	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
North Braddock	.....	.....	.....	2.0C	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

Oil City		7,900C		19,500C		190C							All repairing.	
Philadelphia	268,121C		49,101C	107,027C	39,793C	4,020C		75,781C	12,888MC	14,558C			All kinds.	Buys asphalt from contractors.
Pittsburgh	53,227C	845C	46,465	28,458	9,548								Asph. & stone blks.	Station. asph. plant.
Pottstown				774M										
Quakertown												8,134dw		
Rankin				4,000C										
Reading					15,771w									
Scranton	70,905C		10,488C	3,272C										
Shenandoah	18,345C												Small patches.	
Warren												830bw		
Waynesboro				30,000C										
Westchester												3,906dw		
West Pittston												1,750dw		
Wilkes-Barre	20,388C		4,306C	3,856C									All but asphalt.	
Wilkinsburg				10,682C		377C								
Williamsport				23,280C										
Wilmerding				16,000										
York				6,711C	1,744M									
Rhode Island:														
Pawtucket	562C		2,233M					2,874M		0.23M	0.24M			
Providence	3,660C		34,420MC		25,136C		37,253C		21,072M	3.56M			All but asphalt and bitulithic.	
Riverside												11,277dw		
Woonsocket			4,000C									5,600		
South Carolina:														
Charleston	5,155C				24,475C			9,883					Granite block, macadam, vit. brick.	
Columbia	31,300C			7,300M										
Greenville	16,046			7,000				44,158						
South Dakota:														
Pierre											19,600M			
Sioux Falls						727C								
Watertown				1,986C		12,300C		27,540C						
Tennessee:														
Chattanooga				4,000M				19,900C	4,200C				All.	Hooke asphalt plant
Clarksville										0.7M	0.5M			
Jackson											1,725	1,733n		
Johnson City	33,161C					2,454C		5,649C						
Knoxville	10,126C								1,512C					
Memphis	20,127C		700C	5,210C	20,156C	3,804C		1,870C	13,725C		18,635C	6,432Cb	Asphalt, wood blk. conc. & macadam.	
Mt. Pleasant											12,320			
Texas:														
Abilene									25,690C				All.	
Beaumont	59,832C				42,041C				8,551M					
Corsicana					237w									
Dallas					52,521C	8,402C	31,812C	7,258C	4,942C	0.5M	2.0M	9,000rw	Brick, wood block, bit. macadam.	
Denison				4,000w		16,000w								
Galveston				16,103C		36,770C						38,737z		
Greenville				8,300w	150w									
Hillsboro				5,000										
Houston				48,671w	27,788w							2,000rw		
Longview				2,000w										
Nacogdoches				3,800w										
New Braunfels					196w									
Marshall									3,300					
Paris				10,600C	2,000Cu					1,500C		19,000Cp		
Port Arthur	30,000M											70,000M		
San Angelo								40,000						
San Antonio				32,000w	1,266w									
Temple				26,000w										
Tyler				3,616w										
Waco				28,000C			86,000C				16,000C	3,000bw	All but asphalt.	
Wichita Falls					8,000C	2,000			20,000C					

For footnotes, see page 315.

TABLE NO. 1.—NEW PAVING DONE DURING 1913. (Continued.)

City.	Sheet asphalt.	Asphalt block.	Granite sandstone or other stone block.	Brick or clay block.	Creosoted wood block.	Concrete.	Bitulithic.	Bituminous Concrete.	Bituminous Macadam.	Plain or water-bound Macadam.	Gravel.	Other kinds.	Repairing done by city with its own force.	Kind of repair plant used by city.
Utah:														
Lehi											27.0M			
Ogden	17,979Co									9,593M				
Salt Lake City	2.0C					0.6C						2.0Cp		
Vermont:														
Barre			7,700								6,720			
Bennington												3,600Cd		
Burlington										5,530			All.	
Rutland									1,245C		1,697Mc			
Virginia:														
Bristol					700w									
Danville				56,600g			29,000Cq	13,000q	11,000Mq				All.	
Farmville						8,300w								
Lynchburg					9,450w									
Newport News										4,250				
Norfolk					5,450w									
Portsmouth				5,745C									Brick.	
Petersburg					4,608w									
Pulaski										14,000C				
Suffolk				2,000M		3,020M				1,700M			All.	
Washington:														
Aberdeen						21,800w								
Bellingham						11,500w								
Burlington												15,260bw		
Centralia					3,000C	31,000C								
Ellensburg											26,666	1,000b		
Hoquiam						710	3,126	46,991					Concrete base only.	
Kent												11,300bw		
Monroe												29,700bw		
North Yakima				936C				30,811C						
Pullman				2,460C			22,400C		2,882C					
Renton				16,160C							66,600C			
Seattle	205,075C		3,749C	144,200C	518C	5,456C		5,736C					All.	H. & B. asph plant.
South Bend						14,441M								
Spokane	417C			6,019C	3,531C	1,054C		565,668C				60,734r	All bituminous.	H. & B. asph plant.
Tacoma	196,283C			7,243C	7,150C	4,349C		33,053C				2.58Cs		
Vancouver							13,500		5,780C	411C	11,200C	4,075Cb		
Walla Walla												3,190Cb		
West Virginia:														
Bluefield									21800C					
Charleston						4,000								
Moundsville				8,164C									Most all.	
Parkersburg				17,736C									All trench repairs.	
Wheeling	12,552t			18,506t							9,760C		All.	Equitable Asphalt Co. plant.
Wisconsin:														
Appleton	23,000										3.0			
Beloit	3			7.0C	1,300C			13,000C		3.0C	50,000C			
Burlington				5,171							16,000			
Columbus								8,600C						
Delavan				10,100										
De Pere						10,000								
Eau Claire				400M	2,000M				8,000M				All.	
Fond du Lac						3,870w								
Green Bay	13,734C					2,000C			13,642C					
Janesville				3,000C					3,496C	10,950C			All.	Road roller, etc.
Jefferson						8,500w								
Kimberly						8,000w								
Madison	12,294							23,495	17,651	7,710				
Marinette										17,000			All.	
Merrill									2,700M	3,300M				
Milwaukee						302,700w								
Neenah				2,444C					17,387C	3,444C			Macadam.	
Oconto										3,911			All.	
Oshkosh						31,138C		3,841C	7,273C					
Plymouth						4,500w								
Port Washington						15,000w								
Richland Center						4,000C				12,000M				

Sheboygan	.....	.....	.....	3,515C	1,374C	23,052C	.....	.....	.....	14,185C	.....	.....	Minor repairs.	.....
So. Milwaukee	.....	.....	.....	3,690	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Superior	.....	.....	.....	.....	48,465C	.....	.....	.....	.....	.....	.....	.....	.....	.....
Watertown	.....	.....	.....	.....	.....	2,700w	.....	.....	39,000	3,500	.....	.....	.....	.....
Waukesha	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wauwatasa	85,000C	.....	.....	.....	.....	.....	.....	.....	.....	75,000	.....	.....	.....	.....
West Allis	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wyoming:														
Laramie	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3,466	.....	.....	.....
Sheridan	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	20,017b	.....	.....
Sheridan	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	21,850bw	.....	.....
Canada:														
Brantford, Ont.	.....	.....	.....	.....	.....	.....	1.25	.....	.....	.....	.....	.....	.....	.....
Kingston, Ont.	12,800C	.....	.....	.....	.....	.....	.....	9,675M	18,000M	.....	.....	.....	.....	.....
London, Ont.	.....	.....	.....	.....	5,482M	.....	13,998C	.....	.....	19,056M	.....	.....	.....	.....
Montreal, Que.	24,521MC	115,496MC	2,048C	.....	.....	.....	.....	20,000C	.....	.....	.....	.....	.....	.....
Port Arthur, Ont.	.....	.....	.....	.....	.....	.....	3,552C	.....	61,405C	.....	.....	.....	Repairing trenches.	.....
St. Catherines, Ont	.....	.....	.....	.....	.....	27,634C	36,047MC	4.....	.....	.....	.....	5,466Cv	.....	.....
Saskatoon, Sask.	18,947C	.....	6,085C	.....	.....	27,085C	.....	.....	.....	.....	.....	.....	.....	.....
Sault Ste Marie, O.	.....	7,307C	.....	.....	.....	.....	38,334C	.....	9,510C	.....	.....	.....	.....	.....
Stratford, Ont.	.....	.....	6,156C	.....	.....	.....	.....	.....	10,300M	.....	.....	8,000Cv	.....	.....
Toronto, Ont.	406,320MC	2,171C	7,900C	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	asphalt
			30,107MC	2,291C	24,968MC	59,522MC	64,918MC	24,525MC	5,859MC	.....	10,312MCb	All.	Municipal plant.	
Vancouver, B. C.	.....	2,986C	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Windsor, Ont.	.....	3,159	4,847C	10,587	6,214C	6,255C	26,474C	.....	.....	.....	.....	All.	.....	.....
Winnipeg, Man.	117,026M	16,410C	.....	.....	96,269C	.....	.....	.....	.....	.....	.....	All.	.....	.....
		.....	.....	2,285Mu	16,313MC	.....	27,143M	.....	2,178M	.....	.....	All.	Lutz heaters & asphalt plant.	
Halifax, N. S.	.....	.....	470M	.....	.....	.....	.....	.....	.....	.....	.....	Stone block.	.....	

a—Not including some street commissioner, of which no records are kept.
b—Concrete with bituminous top.
c—Oil macadam, penetration method.
d—Amiesite.
e—5,950 sq. yds. laid by Trolley Company.
f—5,802 of Amiesite, rest macadam with Tarvia surface.
g—Tarvia.
h—Also 2,288 by street railway.
i—Of this 978 was creosoted and the remainder untreated wood block.
j—Sand-clay.
k—Rock asphalt.
l—4,285 of Amiesite, the rest Glutrin macadam.
m—Amount not given.
n—Glutrin.
o—Does not include street railway portion.
p—Utah rock asphalt.
q—Includes all laid to date.
r—Spokane bituminous surface.
s—Plank.
t—Excavation and concrete by contract, surface by the city.
u—Untreated wood block.
v—Westrumite.
w—Figures furnished by dealers.
x—Natural soil oiled.
y—Iron slag block.
z—Shell road.
c—By contract. m—By municipality by force account.
NOTE—Quantities are in either square yards or miles; size will indicate which.

(*Continued from page* 304.)

nished by the latter were considered the more reliable. The figures are probably as up-to-date as it is possible to furnish. Most of them have been received within two weeks and all within three weeks of the appearance of this issue. The figures for contemplated work, however, could not be given yet by a great many cities for the reason that many city councils do not decide this matter until March or even later, and the officials would naturally prefer not to commit themselves publicly to a forecast of what their council would do in the matter. In other cities most paving is done only on request from the abutting property, which requests may continue to straggle in all summer. This table, however, shows that in some states the state laws or local practices favor early decisions, greatly to the credit of the officials and the advantage of the work.

The table of sidewalk, curb and gutter work done last year is unavoidably incomplete for another reason—that in many cities this work is under little or no supervision by any city department or official, being considered as private work, and consequently no records of it are kept.

The table of work done last year is therefore the most complete. But no claim is made that it is absolutely so. In fact it will be recognized that two or three of the larger cities are missing, and quite a number of the small places. Some of these we hope to obtain and present later in a supplementary table; but most of them, we believe, failed to report because they had done no paving work or were ashamed of the smallness of the amount. In view of this, it would be manifestly incorrect and might be unfair to attempt to make, from this table, an **exact** comparison of the relative amounts of the different kinds of paving done, since figures from one large city might change the order of precedence. But the omissions are so few and the entire country so well covered, that we feel justified in saying that these tables give an excellent and approximately exact idea of street paving work the country over. We know of no other source from which anything like so complete or so recent information is available.

Municipal Journal has gone to considerable expense and trouble in collecting and printing these statistics. In past years numerous daily papers and periodicals have honored us by publishing statistics and excerpts from these tables. We are glad to have them do so, but we ask for—and think we are entitled to—credit to this paper for any such use of the tables or the other paving data in this issue.

CITIES IN WHICH NO WORK WAS DONE IN 1913.

Alabama.—Troy.
California.—Palo Alto, Pomona, Porterville, San Mateo, Watsonville.
Colorado.—Canon City, La Junta, Leadville.
Connecticut.—Ansonia, Torrington, Winsted.
Delaware.—Milford.
Florida.—Palatka.
Georgia.—Americus, Dublin, Fort Valley, La Grange.
Idaho.—Lewiston, Nampa, Wallace, Sand Point.
Illinois.—Charleston, Collinsville, DeKalb, East St. Louis, Galena, Litchfield, Morengo, Morrisville, Mt. Carmel, Mt. Vernon, Pana, Sterling, Urbana, Wheaton, Zion City.
Indiana.—Boonville, Huntington, Logansport, Monticello, Marion, Mt. Vernon, Noblesville.
Iowa.—Centerville, Chariton, Creston, Missouri Valley, Marengo, Storm Lake, Billisca.
Kansas.—Augusta, Belleville, Cherryville, El Dorado, Great Bend, Independence, Minneapolis, Salina, Wellington.
Kentucky.—Catlettsburg, Ludlow, Middlesborough, Paducah, Pineville.
Louisiana.—Baton Rouge, Lake Charles.
Maine.—Norway.
Massachusetts.—Arlington, Westfield.
Michigan.—Adrian, Hancock, Hillsdale, St. Joseph,

(*Continued on page* 321.)

TABLE NO. 2.—SIDEWALKS, CURBS AND GUTTERS LAID DURING 1913.

City	Sidewalks Material	Sq. Yds.	Cost	Curbs Material	Lin. Ft.	Cost	Gutters Material	Sq. Yds.	Lin. Ft.	Cost
Alabama:										
Birmingham	Concrete	12,423	$0.815	Concrete	4,327	$0.333	Concrete	9,150	.....	$1.08
	.....	.....	....	Granite	9,437	0.577	Conc. comb. a	....	33,134	0.61
	.....	.....	.....	.....	.....	....	Vit. brick	1.591	.....	1.19
Dothan	Concrete	1,000	1.10	.....	.....	....	.....	....	.....	....
Gadsden	Concrete	20,000	0.90	Concrete	6,000a	0.70	.....	....	.....	....
Arizona:										
Phoenix	.....	.....	....	Concrete	18,000a	1.10	.....	....	.....	....
Arkansas:										
Fort Smith	Concrete	11,100	0.81	Concrete	58,000a	0.35	.....	....	.....	....
Marianna	Concrete	2,000	0.15c	Concrete	5,280	0.35	Concrete	....	5,280	0.20
Pine Bluff	Concrete	12,200	0.9675	Concrete	3,000a	0.50	.....	....	.....	....
California:										
Anaheim	.....	.....	....	Concrete	6,450	0.26	.....	....	.....	....
Los Angeles	Concrete	.....	0.90	Concrete	...	0.35	Concrete	....	.....	1.62b
Modesto	Concrete	60,460	1.08	Concrete	10,975	0.45	Concrete	1,865	16,784	0.375
Oakland	Concrete	109,647	0.72-1.98	Concrete	85,032	0.25-0.86	Concrete	53,196	.....	0.11-0.18
	.....	.....	....	Flagstone	3,180	1.23-1.51	Stone block	976	.....	0.40-0.46
	.....	.....	....	Wood	117,472	0.10-0.14	Broken rock	6,051	.....	0.10-0.14
Ontario	Concrete	1,466	.81	.....	.....	....	Concrete	2,640	.....	.48
Oxnard	Concrete	4,500	0.99	Concrete	8,000	0.35	Concrete	....	900	0.50
Palo Alto	Concrete	465	0.55c	Concrete	846	0.30	.....	....	.....	....
Porterville	Concrete	3,000	1.08	Concrete	5,280	0.35	.....	....	.....	....
Richmond	Concrete	25,355	1.125	Concrete	44,315	0.32	Concrete	12,704	.....	1.62
San Mateo	Concrete	.....	1.08	Concrete	.....	0.35c	Concrete	....	.....	0.20c
Santa Ana	Concrete	8,300	.72	Concrete	20,000	.25	Concrete	....	2,500	....
Santa Barbara	.....	.....	....	Concrete	22,500a	1.00-1.25	.....	....	.....	....
Waterville	Concrete	2,533	1.00	Concrete	3,900	0.30	Concrete	470	.....	1.26
Colorado:										
Colorado Springs	Concrete	24,000	0.72-0.99	Concrete	5,380a	....	.....	....	.....	....
Grand Junction	Concrete	8,000	1.08	.....	.....	....	.....	....	.....	....
Leadville	Concrete	7,000	2.00	Concrete	9,700	....	Concrete	....	9,700	0.5625
	Flagstone	500	3.60	.....	.....	....	.....	....	.....	....
Longmont	Concrete	2,500	1.00	Concrete	2,000	0.17	Concrete	....	800	0.15
	Flagstone	1,000	0.65	.....	.....	....	.....	....	.....	....
Connecticut:										
Danbury	Concrete	.....	1.20	Concrete	.....	0.35	.....	....	.....	....
	Tar	.....	0.75-0.90	.....	.....	....	.....	....	.....	....
East Hartford	Concrete	6,000	1.026	Concrete	400	0.37	.....	....	.....	....
Killingly	.....	.....	....	Flagstone	680	1.50	Cobble	300	.....	0.60
Meriden	Concrete	96,985	....	Concrete	13,445	....	.....	....	.....	....
New Britain	Concrete	12,680	0.77	Concrete	25,515	0.46	.....	....	.....	....
Southington	Concrete	9,540	1.20d	Concrete	16,032	....	Concrete	....	3,000	....
Torrington	Concrete	3,300	....	Concrete	6,632	....	Concrete	....	6,832	0.30
	Tar	.....	0.75	Granite	3,173	0.55	Cobble	....	500	0.15
Delaware:										
Wilmington	.....	.....	....	.....	.....	....	Concrete	1,786	.....	....
District of Columbia	Concrete	68,000	....	Concrete	40,000	1.12-1.15	.....	....	.....	....
Florida:										
Clearwater	Concrete	1,402	1.03	Concrete	34,852a	0.55-0.4945	.....	....	.....	....
Gainesville	Concrete	7,000	1.15	Concrete	1,200	0.50	.....	....	.....	....
				Granite	23,000	0.40	.....	....	.....	....
Palatka	Concrete	7,000	0.819	.....	.....	....	.....	....	.....	....
Sarasota	Concrete	17,000	0.99	.....	.....	....	.....	....	.....	....
Georgia:										
Atlanta	Tile	178,255	0.88	Granite	159,182	0.36	Rubble	22,184	55,840	0.48b
Brunswick	Tile	1,200	0.98	.....	.....	....	.....	....	.....	....
Dublin	Tile	3,300	1.02	Concrete	5,000	0.25	.....	....	.....	....
Macon	Concrete	11,264	0.90	Granite	15,442	0.25	Concrete	2,726	.....	0.54
Savannah	.....	.....	....	Granite	6,900	0.33	.....	....	.....	....
Idaho:										
Lewiston	Concrete	9,410	0.90	Concrete	19,000	0.30	Concrete	....	5,000	0.40
Moscow	Concrete	3,900	1.08	Concrete	22,000	.37	.....	....	.....	....
Nampa	Concrete	200	....	Concrete	140	....	.....	....	.....	....
Pocatello	Concrete	90,644	1.17	Concrete	136,000	....	.....	....	.....	....
Illinois:										
Aurora	.....	.....	....	Concrete	56,100a	0.50	.....	....	.....	....
Bloomington	Concrete	44,112	0.7875	Concrete	300	0.57	Concrete	....	35,920a	0.54
	.....	.....	....	Flagstone	3,977	0.56	.....	....	.....	....
Canton	Concrete	1,390	0.90	Concrete	2,640a	0.55	.....	....	.....	....
	Brick	812	0.90	Stone	7,920	0.55	.....	....	.....	....
Casey	.....	.....	....	Concrete	2,390a	0.425	.....	....	.....	....
Chicago	Concrete	724,170	1.21	Concrete	80,149	.57-.73r	Concrete	....	23,437	....
	Cinders	150,000	.385	Flagstone	358,359	.79	Concrete	....	543,566a	.45-.63r
Chicago Heights	.....	.....	....	Concrete	3,320	.60	.....	....	.....	....
Elgin	Concrete	26,400	....	Concrete	15,887a	....	.....	....	.....	....
Galesburg	.....	.....	....	.....	.....	....	Concrete	....	17,429	0.58
Galva	Concrete	.....	0.90-1.17	Concrete	1,978	0.20	Concrete	....	10,877a	0.70
Granite City	Concrete	38,756	....	Concrete	9,800a	0.95	.....	....	.....	....
Harvey	Concrete	12	....	Concrete	40	....	.....	....	.....	....
Jerseyville	Concrete	4,500	0.99	.....	.....	....	.....	....	.....	....
Lake Forest	.....	.....	....	Concrete	3,000	0.35	.....	....	.....	....
Momence	Concrete	33,000	0.60c	Concrete	16,200a	0.45	.....	....	.....	....
Monmouth	Concrete	4,600	1.50	Concrete	13,500a	0.55	.....	....	.....	....
Murphysboro	Concrete	35,000	1.05	Concrete	3,500a	0.55	.....	....	.....	....
Normal	Concrete	.....	0.99	Concrete	1,100	0.28	Concrete	....	8,000	0.50
Oak Park	Concrete	1,600	0.60c	Concrete	31,016a	0.57	.....	....	.....	....
Paris	Concrete	900	0.90	.....	.....	....	.....	....	.....	....
Prophetstown	.....	.....	....	Concrete	350a	0.55	.....	....	.....	....
Springfield	.....	.....	....	Flagstone	16,621	0.55	.....	....	.....	....
Urbana	Concrete	4,000	0.99	.....	.....	....	.....	....	.....	....
Waukegan	Concrete	4,000	0.75c	Concrete	13,600a	0.50	.....	....	.....	....
Indiana:										
Bloomington	Concrete	820	1.08	Concrete	550	0.34	Concrete	....	960	0.60
Frankfort	Concrete	9,930	0.87	Concrete	12,485	0.15-0.23	Concrete	....	4,918	0.345-0.35
Gary	Concrete	66,492	0.95-1.08	Concrete	121,562	0.35-0.45	.....	....	.....	....
Goshen	Concrete	4,700	....	.....	.....	....	.....	....	.....	....
Greencastle	.....	.....	....	Concrete	500	0.45	.....	....	.....	....
Lafayette	Concrete	4,050	0.72	Concrete	4,200a	0.45	.....	....	.....	....
La Porte	Concrete	6,250	1.40	Concrete	2,300a	1.00	.....	....	.....	....
Mishawaka	Concrete	3,000	0.35c	Concrete	3,320	0.20	.....	....	.....	....
Muncie	Concrete	5,983	0.99	Concrete	24,115a	0.47	.....	....	.....	....
Newcastle	Concrete	1,800	0.47c	Concrete	6,000	0.40	.....	....	.....	....
Noblesville	Concrete	8,086	0.90	.....	.....	....	.....	....	.....	....
	Flagstone	90	....	.....	.....	....	.....	....	.....	....

For footnotes, see page 320.

TABLE NO. 2.—SIDEWALKS, CURBS AND GUTTERS LAID DURING 1913. (Continued.)

City	Sidewalks			Curbs			Gutters			
	Material	Sq. Yds.	Cost	Material	Lin. Ft.	Cost	Material	Sq. Yds.	Lin. Ft.	Cost
Indiana:										
North Vernon	Concrete	3,000	....	Concrete	3,000a	0.55	.....	....	.....	....
Portland	.....	.....	....	Concrete	1,042	0.25	Concrete	....	6,033	0.425
South Bend	Concrete	45,380	0.72	Concrete	95,940	0.19	.....	....	.....	....
Terre Haute	Concrete	6,000	0.50c	Concrete	7,000	0.35	.....	....	.....	....
Washington	Concrete	12,600	0.50c	Concrete	6,000a	0.45	.....	....	.....	....
Iowa:										
Algona	.....	.....	....	Concrete	14,175a	0.56	.....	....	.....	....
Bloomfield	Concrete	3,000	0.30c	Concrete	17,000	0.40	.....	....	.....	....
Burlington	Concrete	7,000	1.08	Concrete	22,440	0.32	Concrete	....	4,451a	0.55
Cedar Rapids	Concrete	29,333	0.99	Concrete	72,300a	0.65	.....	....	.....	....
Corning	.....	.....	....	Concrete	17,000a	0.675	.....	....	.....	....
Fort Dodge	Concrete	3,700	0.45-0.50c	Concrete	24,080a	0.63	.....	....	.....	....
Fort Madison	.....	.....	....	Concrete	16,000a	0.49	.....	....	.....	....
Iowa City	Concrete	9,000	0.99	Concrete	23,000	0.53	.....	....	.....	....
Manchester	Concrete	2,500	0.90	Concrete	9,500a	0.35	.....	....	.....	....
Marengo	Concrete	20,000	0.80	Concrete	1,200	0.30	.....	....	.....	....
Mason City	.....	.....	....	Concrete	10,200	0.35	.....	....	.....	....
Muscatine	Concrete	12,600	0.99	Concrete	22,274a	0.53	.....	....	.....	....
Newton	Concrete	270	0.90	.....	.....	....	.....	....	.....	....
Oskaloosa	Concrete	2,000	0.99	Concrete	2,760a	0.60-0.65	.....	....	.....	....
Perry	Concrete	5,000	0.58	.....	.....	....	.....	....	.....	....
Sioux City	Concrete	7,220	1.08	Concrete	13,572	0.35	Concrete	....	10,000	0.30
Kansas:										
Abilene	.....	.....	....	Concrete	23,900a	0.49	.....	....	.....	....
Arkansas City	Concrete	3,000	0.72	Concrete	10,500	0.30	Concrete	....	2,000	0.20
Augusta	Concrete	20,000	0.72	Concrete	30,000	0.20	Concrete	....	2,000	0.30
Chanute	Brick	2,500	0.25c	Concrete	5,800a	0.50	.....	....	.....	....
Coffeyville	Concrete	1,800	0.75-0.99	Concrete	4,000a	0.40	.....	....	.....	....
	Brick	6,000	0.36-0.45c	.....	.....	....	.....	....	.....	....
Fort Scott	Concrete	2,000	0.90	Concrete	2,640	0.30	Concrete	....	18,109a	0.50
Hutchinson	.....	.....	....	Concrete	10,000	0.32	Concrete	....	5,000	1.20b
Independence	.....	.....	....	Concrete	3,100a	0.50	.....	....	.....	....
Junction City	Concrete	2,220	0.90	Concrete	24,820a	0.43	.....	....	.....	....
Kansas City	Concrete	5,500	1.062	Concrete	73,727	0.38	Concrete	....	3,582a	0.54
Leavenworth	.....	.....	....	Concrete	4,961	0.35	.....	....	.....	....
McPherson	.....	.....	....	Concrete	15,000a	0.57	.....	....	.....	....
Minneapolis	Concrete	7,200	.81-.108	.....	.....	....	.....	....	.....	....
	Brick	17,780	....	.....	.....	....	.....	....	.....	....
Olathe	Concrete	1,800	0.65c	.....	.....	....	.....	....	.....	....
Ottawa	.....	.....	....	Concrete	3,012a	0.44	.....	....	.....	....
Parsons	.....	.....	....	Concrete	16,000a	0.43	.....	....	.....	....
Pittsburg	Brick	.....	0.72	Concrete	41,300	0.50e	Concrete	....	.....	0.40e
Salina	Concrete	5,700	0.40c	.....	.....	....	.....	....	.....	....
Topeka	Concrete	11,100	.945	Concrete	55,000a	0.345	.....	....	.....	....
Wellington	Concrete	900	2.90	.....	.....	....	.....	....	.....	....
Wichita	Concrete	1,800	....	.....	.....	....	.....	....	.....	....
Kentucky:										
Dayton	Concrete	2,000	1.125	Concrete	10,000a	0.55	.....	....	.....	....
Highland	.....	.....	....	Concrete	5,000a	0.54	.....	....	.....	....
Lexington	Concrete	1,200	1.35	Concrete	33,000	0.45	Concrete	....	.....	0.30
	.....	.....	....	Flagstone	2,800	0.75	Brick	2,100	.....	1.45
Newport	.....	.....	....	Concrete	12,617a	.60	.....	....	.....	....
Paducah	Concrete	12,940	0.36	Granite	15,404	0.78	Concrete	....	15,170	0.25
Pineville	Concrete	400	1.12	Concrete	375	0.25	.....	....	.....	....
Louisiana:										
Lake Charles	Concrete	39,000	1.14	Concrete	65,000	....	.....	....	.....	....
Maine:										
Bangor	Concrete	334	....	Concrete	4,000	....	.....	....	.....	....
	.....	.....	....	Tar concrete	9,886	....	.....	....	.....	....
Maryland:										
Baltimore	.....	.....	....	Concrete	.....	0.625f	.....	....	.....	....
Pocomoke City	Concrete	2,000	1.35	Concrete	32,000	0.35	.....	....	.....	....
Westminster	Concrete	1,800	....	Concrete	2,535a	....	.....	....	.....	....
Massachusetts:										
Adams	Concrete	4,000	1.28	.....	.....	....	.....	....	.....	....
Andover	Tar concrete	3,200	....	.....	.....	....	.....	....	.....	....
Boston	Concrete	127,000	1.44	Concrete	218	1.00	.....	....	.....	....
	Brick	3,000	1.10	Granite	100,000	1.25	.....	....	.....	....
Cambridge	Concrete	2,913	1.89	.....	.....	....	.....	....	.....	....
Everett	Concrete	5,430	1.838	Granite	8,820	1.011	.....	....	.....	....
Fall River	Concrete	23,679	1.34	Granite	16,372	1.53g	Cobble	....	16,372	....
Haverhill	Concrete	1,304	1.50	.....	.....	....	Cobble	1,553	3,494	0.80b
	Tar concrete	2,503	0.50	.....	.....	....	.....	.....	.....	....
Lawrence	Tar concrete	13,200	....	Granite	27,000	....	Concrete	345	.....	1.80
	Concrete	5,077	1.00	Concrete	895	0.44	.....	....	.....	....
Lowell	Tar con. plain	2,095	0.38	Granite	10,817	0.60	.....	....	.....	....
	Tar con. hard	6,067	0.65	.....	.....	....	.....	....	.....	....
Lynn	Concrete	16,227	....	Concrete	29,383	....	.....	....	.....	....
	Tar concrete	1,958	....	Granite	5,661	....	.....	....	.....	....
Medford	Tar concrete	6,788	1.25	Granite	23,882	1.30	.....	....	.....	....
	Brick	388	1.25	.....	.....	....	.....	....	.....	....
New Bedford	Concrete	12,616	.83p	Granite	29,779	....	Cobble	17,690	40,744	....
Somerville	Concrete	17,147	1.41h	Granite	12,182	1.02	Granite blk.	3,669	.....	2.25
	Brick	1,006	1.30	.....	.....	....	.....	....	.....	....
Southbridge	Concrete	1,700	....	Concrete	2,800	....	Concrete	....	2,800	....
Springfield	Concrete	4,069	1.429	Concrete	3,679	0.52	Concrete	....	4,583a	0.85
	.....	.....	....	Granite	13,619	0.96	.....	....	.....	....
Waltham	Concrete	522	2.07	Granite	3,778	0.91	Paving stone	....	1,240	0.15
	Flagstone	22	3.90	.....	.....	....	.....	....	.....	....
	Tar concrete	3,199	0.36	.....	.....	....	.....	....	.....	....
Westfield	Concrete	3,978	1.00	Concrete	1,451	....	.....	....	.....	....
Worcester	Concrete	13,759	1.60	Concrete	233	.81	Concrete	1,861	.....	1.75
	.....	.....	....	Granite	14,254	.90	Stone blocks	12,477	....	2.00
Michigan:										
Alpena	Concrete	2,000	....	Granite	5,900	....	.....	....	.....	....
Ann Arbor	Concrete	.....	0.90	Granite	30,000	0.22c	.....	....	.....	....
Battle Creek	Concrete	33,700	0.70	.....	.....	....	.....	....	.....	....
Bay City	Concrete	7,796	0.855	Concrete	40,755	0.25	.....	....	.....	....
Benton Harbor	.....	.....	....	Concrete	18,400a	0.34	.....	....	.....	....
Grand Rapids	Concrete	3,000	0.70	Concrete	7,500	0.40	Concrete	....	30,000a	0.45
Hillsdale	Concrete	2,400	0.35c	Concrete	1,200a	0.20	.....	....	.....	....
Holland	Concrete	3,000	0.72	Concrete	5,000	....	.....	....	.....	....
Kalamazoo	Concrete	631	0.90	Concrete	9,858a	0.50	.....	....	.....	....
Lansing	Concrete	3,990	0.756	Concrete	13,975a	0.48	.....	....	.....	....
Saginaw	Concrete	32,250	0.50c	Concrete	.....	0.33	Concrete	8,185	.....	1.52
	.....	.....	....	Flagstone	4,410	0.80	.....	....	.....	....
	.....	.....	....	Sandstone	17,557	0.53	.....	....	.....	....
St. Cloud	Concrete	3,987	0.80	Concrete	20,000	0.29	Concrete	....	785a	0.50
	.....	.....	....	Granite	2,012	....	.....	....	.....	....
St. Joseph	Concrete	1,480	0.72	.....	.....	....	.....	....	.....	....
Sturgis	Concrete	7,000	0.75	Concrete	1,920a	0.49	.....	....	.....	....

For footnotes, see page 320.

TABLE NO. 2.—SIDEWALKS, CURBS AND GUTTERS LAID DURING 1913. (Continued.)

City	Sidewalks Material	Sq. Yds.	Cost	Curbs Material	Lin. Ft.	Cost	Gutters Material	Sq. Yds.	Lin. Ft.	Cost
Minnesota:										
Bemidji	Concrete	3,000	.855	Concrete	2,880	.30	.....	....	.....	....
Chisholm	Concrete	408i	1.44	Concrete	14,319a	0.55	.....	....	.....	....
Crookston	Concrete	5,902	0.81	Concrete	3,647a	0.38	.....	....	.....	....
Duluth	Concrete	21,000	1.21-1.37	Concrete	.....	0.70	Concrete	....	.....	0.60
	Plank	5,000	j	Sandstone	.....	0.90	.....	....	.....	....
Eveleth	.....	.....	....	Concrete	3,400a	0.75	.....	....	.....	....
Faribault	Concrete	3,449	0.85	Concrete	900	0.45	.....	....	.....	....
Minneapolis	Flagstone	105,784	0.72	Concrete	392,409a	0.35	.....	....	.....	....
	.....	.....	....	Granite	6,890	0.90	.....	....	.....	....
Owatonna	Concrete	666	0.75	Concrete	400	0.32	Concrete	....	132	0.40
Red Wing	Concrete	1,100	0.55c	Concrete	2,000	0.30	Concrete	....	2,000	0.25
Rochester	Concrete	3,382	0.861	Concrete	1,578	0.38	Concrete	....	9,400a	0.55
St. Paul	Concrete k	49,966	....	Concrete	87,754	....	.....	....	.....	....
Stillwater	Concrete	1,200	.81	Concrete	500	.30	.....	....	.....	....
Winona	Concrete	20,000	0.81	Concrete	3,873	0.30	Flagstone	....	2,118	0.40
Mississippi:										
Hattiesburg	Concrete	1,700	1.15	.....	.....	....	.....	....	.....	....
Meridian	Concrete	20,000	0.775	Concrete	7,444	0.32	Concrete	....	1,872	0.90
Vicksburg	Concrete	8,500	....	Concrete	.....	0.75	.....	....	.....	....
Aurora	Concrete	2,400	0.90	.....	.....	....	.....	....	.....	....
Boonville	Concrete	3,500	1.08	Concrete	1,000	0.32	.....	....	.....	....
Cape Girardeau	Concrete	2,200	0.50c	Concrete	9,200	0.50	.....	....	.....	....
Clinton	Concrete	5,000	....	Concrete	5,280	0.35	.....	....	.....	....
Columbia	Concrete	1,679	0.912	Concrete	12,149	0.335	.....	....	.....	....
De Soto	Concrete	666	1.08	.....	.....	....	.....	....	.....	....
Fulton	.....	.....	....	Concrete	500	0.40	.....	....	.....	....
Jefferson	.....	.....	....	Concrete	23,000a	0.75	.....	....	.....	....
Joplin	Concrete	3,900	....	Concrete	24,105	...,	Concrete	....	25,872	....
Kirksville	Concrete	22,000	1.08	.....	.....	....	.....	....	.....	....
Kirkwood	Concrete	2,347	1.08	Concrete	5,000a	0.55	.....	....	.....	....
Mexico	Concrete	2,500	1.35	Concrete	5,675	0.37	.....	....	.....	....
Nevada	Concrete	2,000	0.90	Concrete	1,500	0.40	Concrete	....	1,500	0.20
	Brick	150	0.60	.....	.....	....	.....	....	.....	....
Poplar Bluff	Concrete	4,500	1.125-1.35	Concrete	7,000	0.40	Concrete	....	7,000	.40
Sedalia	Concrete	5,500	1.08	Concrete	8,000	0.35	.....	....	.....	....
Trenton	Concrete	11,000	1.125	Concrete	850	0.39	.....	....	.....	....
Missouri.										
Hannibal	Concrete	20,000	1.08	Concrete	1,000	.35	Concrete	....	4,000	.30
Montana:										
Billings	Concrete	1,200	0.75	Concrete	1,200	0.395	Concrete	....	11,500	0.34
Bozeman	Concrete	1,000	1.4225	Concrete	7,500	0.48	.....	....	.....	....
Butte	Concrete	14,670	1.40	Concrete	28,000	0.35	.....	....	.....	....
Great Falls	Concrete	30,866	1.26-1.215	Concrete	70,869	0.40	.....	....	.....	....
Helena	Concrete	62,500	1.17-0.92	Concrete	105,000	.30-.35	Concrete	....	16,500a	.75-.80
Missoula	Concrete	12,107	1.44c	Concrete	791	0.40	.....	....	.....	....
Nebraska:										
Blair	Concrete	507	1.66	.....	.....	....	.....	....	.....	....
David City	.....	.....	....	Concrete	7,000a	0.475	.....	....	.....	....
Tremont	Concrete	6,666	0.81	Concrete	3,764	0.30	Concrete	....	430	0.35
	.....	.....	....	Concrete	3,917	.43-.60	.....	....	.....	....
Hastings	Concrete	1,470	0.99	.....	.....	....	.....	....	.....	....
Lincoln	Concrete	21,918	1.08	Concrete	61,457	....	Concrete	15,514	55,851	....
	Brick	328	0.81	.....	.....	....	.....	....	.....	....
Norfolk	Concrete	3,600	0.40c	Concrete	25,000a	0.54	.....	....	.....	....
Omaha	Concrete	37,330	1.0305	Concrete	1,462	0.5178	Concrete	....	26,612a	0.6504
	Brick	3,526	0.90	Stone	17,633	0.8071	.....	....	.....	....
Red Cloud	Concrete	405	1.29	.....	.....	....	.....	....	.....	....
So. Omaha	.....	.....	....	Concrete	26,000	0.42	Concrete	....	26,000a	0.65
New Hampshire:										
Berlin	Concrete	820	....	Concrete	5,500	....	.....	....	.....	....
Laconia	Tar concrete	2,000	0.650		,00	0.90	.....	....	.....	....
Portsmouth	Concrete	600	1.70	.....	.....	....	.....	....	.....	....
New Jersey:										
Bayonne	Concrete	6,350	1.71e	Concrete	680	0.67c	Concrete	....	6,390a	0.86e
	Flagstone	6,280	2.34	Bluestone	42,370	1.02e	.....	....	.....	....
Bloomfield	Concrete	450	0.12c	Concrete	3,000a	0.60	.....	....	.....	....
	.....	.....	....	Flagstone	13,200	0.73	.....	....	.....	....
Hammonton	Concrete	168,000	1.08	Concrete	42,200	0.295	Concrete	19,650	.....	0.93
	.....	.....	....	Flagstone	796	0.50	.....	....	.....	....
Metuchen	Flagstone	5,400	.64-.68c	Flagstone	1,500	0.49	.....	....	.....	....
Millville	.....	.....	....	Flagstone	10,000	....	.....	....	.....	....
Passaic	Concrete	20,430	1.24	Concrete	4,450	0.38	Concrete	1,009	2,271	1,26b
Rutherford	Concrete	3,900	1.17	Concrete	9,850a	0.72	Trap & cobble	300	.....	0.60c.l
	Flagstone	2,4001	0.12c	Bluestone	4,000	0.55	.....	....	.....	....
Summit	Concrete	4,150	1.20	.....	.....	....	Cobble	2,540	8,100	0.75b
Ventnor City	Concrete	800	0.92	Concrete	1,400	0.26	Vit. block	8,000	.....	2.51
Westfield	Concrete	1,400	0.50c	Concrete	19,200a	0.85	.....	....	.....	....
	Flagstone	350	0.75c	.....	.....	....	.....	....	.....	....
West New York	Concrete	900	1.35	Concrete	800	1.00	.....	....	.....	....
	Flagstone	1,700	1.35	.....	.....	....	.....	....	.....	....
West Orange	Concrete	450	1.08	Bluestone	750	0.40	Belgian block	....	750	1.50b
New York.										
Albany	Concrete	32,288	1.53	Concrete	20,714	0.73	.....	....	.....	....
	Flagstone	5,040	2.07	.....	.....	....	.....	....	.....	....
	Brick	12,843	1.37	.....	.....	....	.....	....	.....	....
Binghamton	Concrete	17,052	0.90	Concrete	5,254	0.50	Concrete	....	2,748	0.15
Buffalo	Concrete	42,000	0.90	.....	.....	....	.....	....	.....	....
Carthage	Concrete	1,100	0.90	Concrete	2,500	0.30	Concrete	....	4,500a	0.42
Corning	Concrete	4,000	0.60c	Concrete	8,526a	0.64	.....	....	.....	....
Cortland	Concrete	1,500	0.90	Concrete	6,000a	0.50	.....	....	.....	....
Dunkirk	Concrete	11,057	....	Concrete	12,212	....	Concrete	....	12,212	....
Elmira	.....	.....	....	Concrete	15,077	0.39	.....	....	.....	....
	.....	.....	....	Flagstone	16,618	0.872	.....	....	.....	....
Fulton	Concrete	3,500	0.99	Concrete	360	0.70	.....	....	.....	....
Gloversville	Concrete	5,500	0.68c	Concrete	1,739	0.35	Concrete	....	2,614	0.11
Hornell	.....	.....	....	Concrete	6,089a	0.56	.....	....	.....	....
Jamestown	Concrete	30,000	1.08	Concrete	26,000a	0.45	.....	....	.....	....
Little Falls	Concrete	6,000	1.35	Concrete	1,250	0.55	.....	....	.....	....
	.....	.....	....	Flagstone	500	0.95	.....	....	.....	....
Lockport	Concrete	6,270	1.26	.....	.....	....	.....	....	.....	....
Massena	Concrete	2,500	1.08	.....	.....	....	.....	....	.....	....
Newburgh	.....	.....	....	Concrete	18,263	0.75-0.78	.....	....	.....	....
Oneonta	Concrete	1,000	.90	Sandstone	2,486	.68	Concrete	....	709	1.26b
Utica	Concrete	9,000	1.35	Concrete	18,586a	....	.....	....	.....	....
New York City.										
Brooklyn Borough	Concrete	202,284	1.357	Flagstone	198,508g	1.085	.....	....	.....	....
	Flagstone	1,288	2.218	Granite	13,124	1.694	.....	....	.....	....
Niagara Falls	Concrete	28,000	0.70c	m			m			

For footnotes, see page 320.

TABLE NO. 2.—SIDEWALKS, CURBS AND GUTTERS LAID DURING 1913. (Continued.)

City	Sidewalks			Curbs			Gutters			
	Material	Sq. Yds.	Cost	Material	Lin. Ft.	Cost	Material	Sq. Yds.	Lin. Ft.	Cost
New York—Continued.										
No. Tonawanda	Concrete	15,000	1.08	.....	.....	....	.....	....	.....	....
Ogdensburg	Concrete	12,256	0.90	Concrete	6,239	....	.....	....	.....	....
Olean	Concrete	15,000	1.08	Stone	21,000	0.60	.....	....	.....	....
Plattsburg	Concrete	6,543	0.92	.....	.....	....	.....	....	.....	....
Rochester	Concrete	35,960	1.08	.....	.....	....	.....	....	.....	....
Schenectady	Concrete	16,600	1.03	Granite	17,500	0.85	.....	....	.....	....
Solvay	.....	.....	....	Sandstone	4,002	0.85	.....	....	.....	....
Syracuse	Concrete	30,000	0.625c	Concrete	84,500	0.90	.....	....	.....	....
Watertown	Concrete	15,000	1.08	Concrete	5,000a	0.65	.....	....	.....	....
White Plains	Concrete	1,500	1.00c	Flagstone	3,000	0.60	Brick	....	2,500	0.55
North Carolina.										
Gastonia	Concrete	24,000	0.87	.....	.....	....	.....	....	.....	....
Goldsboro	.....	.....	....	Concrete	1,000	0.23	.....	....	.....	....
Greensboro	Concrete	20,000	1.15	.....	.....	....	.....	....	.....	....
Hickory	Concrete	3,300	0.90	.....	.....	....	.....	....	.....	....
Monroe	Concrete	3,000	1.00	Concrete	2,000	0.25	Concrete	....	1,000	1.00b
North Dakota.										
Fargo	Concrete	7,484	1.05	Concrete	23,744	0.40	Concrete	6,194	.....	1.40
Grand Forks	Concrete	7,000	1.08	.....	.....	....	.....	....	.....	....
Williston	Concrete	1,500	....	Concrete	2,630	0.35	Concrete	....	2,630	0.15
Ohio.										
Ada	Concrete	3,500	0.90	Concrete	5,600a	0.34	.....	....	.....	....
Ashtabula	.....	.....	....	Concrete	17,600	.28-.35	.....	....	.....	....
Bucyrus	Concrete	1,090	0.99	.....	.....	....	.....	....	.....	....
	Flagstone	4,916	1.08	.....	.....	....	.....	....	.....	....
Cambridge	Concrete	5,000	1.17	Concrete	7,600	0.35	.....	....	.....	....
	.....	.....	....	Sandstone	7,600	0.65	.....	....	.....	....
Canton	Concrete	2,200	1.00	Concrete	3,600	0.34	.....	....	.....	....
	Flagstone	12,000	1.35	Stone	17,000	0.50	.....	....	.....	....
Chillicothe	Concrete	1,810	0.81	Concrete	3,640	0.30	Concrete	2,840	.....	0.81
Cincinnati	Concrete	10,267	1.17	Concrete	22,129	0.60	Concrete	....	9,614	0.55
	.....	.....	....	Sandstone	1,987	1.20	.....	....	.....	....
	.....	.....	....	Granite	64,626	1.00	.....	....	.....	....
Columbus	Concrete	2,432	....	.....	.....	....	.....	....	.....	....
Delaware	Concrete	2,200	1.215	.....	.....	....	.....	....	.....	....
East Palestine	Concrete	2,400	0.50c	.....	.....	....	.....	....	.....	....
Fairport	Concrete	1,700	0.72	.....	.....	....	.....	....	.....	....
Galion	.....	.....	....	Concrete	5,663	.45	.....	....	.....	....
Greenville	Concrete	1,500	0.45c	Concrete	6,500a	0.58	.....	....	.....	....
Lima	Concrete	15,000	0.90-1.35	Concrete	3,000a	0.45	.....	....	.....	....
Lorain	Flagstone	1,100	0.88	.....	.....	....	.....	....	.....	....
Marion	Flagstone	9,000	0.75c	Flagstone	5,200	....	.....	....	.....	....
Massillon	Concrete	2,800	0.90	Concrete	4,000	0.40	.....	....	.....	....
Mt. Vernon	Concrete	300	0.72	.....	.....	....	.....	....	.....	....
Norwood	Concrete	3,000	1.20	Concrete	25,000a	0.60	.....	....	.....	....
Painesville	Concrete	18,633	0.80	Concrete	10,890	0.46	Concrete	....	5,488	0.12
	Gravel	333	0.31	Flagstone	7,480	0.61	.....	....	.....	....
Sandusky	Concrete	4,500	1.08	.....	.....	....	.....	....	.....	....
	Flagstone	1,500	1.125	.....	.....	....	.....	....	.....	....
Springfield	Concrete	22,000	0.81	Concrete	25,000a	0.37	.....	....	.....	....
Wellsville	.....	.....	....	Concrete	5,280	0.45	Concrete	....	5,280	0.60
Oklahoma.										
Enid	Concrete	1,260	....	.....	.....	....	.....	....	.....	....
Lawton	.....	.....	....	Concrete	13,200a	0.70	.....	....	.....	....
Mangum	Concrete	33,000	....	Concrete	400	....	.....	....	.....	....
Nowata	Concrete	556	1.08	Concrete	4,023	0.38	.....	....	.....	....
	Brick	389	0.81	.....	.....	....	.....	....	.....	....
Ponca City	Concrete	625	1.11	Concrete	322	0.38	Concrete	....	500	0.20
	.....	.....	....	Concrete	5,446a	0.52	.....	....	.....	....
Tulsa	Concrete	18,000	0.52c	m	.....	....	Brick m	....	.....	....
Oregon.										
Astoria	Concrete	7,600	1.35	Concrete	4,650	0.40	Concrete	....	4,650	0.36
Eugene	Concrete	12,349	0.85	Concrete	10,800	0.32	Concrete	....	10,800	0.25
Pendleton	Concrete	6,600	1.15	Concrete	21,914	....	Concrete	....	17,577	....
Pennsylvania.										
Allentown	Concrete	6,000	1.26	Concrete	10,000	0.45	Concrete	2,000	.....	1.26
Catasauqua	Concrete	1,110	1.00	Concrete	3,502a	0.65	.....	....	.....	....
Chambersburg	.....	.....	....	Concrete	2,800	....	.....	....	.....	....
	.....	.....	....	Granite	420	....	.....	....	.....	....
Chester	.....	.....	....	Concrete	7,000	0.50	.....	....	.....	....
	.....	.....	....	Flagstone	4,000	0.73	.....	....	.....	....
Clairton	.....	.....	....	Concrete	8,000a	0.60	.....	....	.....	....
Corry	Concrete	1,300	1.17	Concrete	250	0.40	.....	....	.....	....
	Brick	770	0.90	Sandstone	3,598	0.70	.....	....	.....	....
Du Bois	Concrete	1,090	1.08	.....	.....	....	.....	....	.....	....
	Brick	3,383	0.58	.....	.....	....	.....	....	.....	....
Edwardsville	Concrete	1,112	1.08	Concrete	2,200	0.78	.....	....	.....	....
Erie	Concrete	35,400	1.035	Concrete	22,500	0.34	.....	....	.....	....
Grove City	Concrete	1,000	1.26	Concrete	9,000a	.60-.62	.....	....	.....	....
	Flagstone	600	1.17	.....	.....	....	.....	....	.....	....
Hanover	Concrete	1,050	....	Concrete	3,060	....	.....	....	.....	....
Harrisburg	.....	.....	....	Concrete	211	0.40	.....	....	.....	....
	.....	.....	....	Flagstone	29,594	.70-.87	.....	....	.....	....
Hazleton	Concrete	4,000	1.44	.....	.....	....	Stone	....	5,000	0.35
	Tar Concrete	8,000	0.54	.....	.....	....	.....	....	.....	....
Kingston	.....	.....	....	Concrete	3,000	0.75	.....	....	.....	....
Lewisburg	Concrete	3,520	0.99	Concrete	2,400	0.55	Concrete	....	2,400	0.99
McKees Rocks	Concrete	100	.80	Concrete	14,000	0.70	Concrete	....	400	.90
	.....	.....	....	Sandstone	300	.60	.....	....	.....	....
Meadville	.....	.....	....	Concrete	5,866a	.40-.52	.....	....	.....	....
Monongahela	Concrete	1,200	1.35	Concrete	8,000	.48	.....	....	.....	....
North Braddock	Concrete	1,550	1.65	Concrete	12,000a	0.65	.....	....	.....	....
Oil City	Concrete	7,500	1.44-1.53	Concrete	17,000a	.53-.65	.....	....	.....	....
Pittsburgh	Concrete	55,365	1.46	Concrete	5,946	.70	.....	....	.....	....
	.....	.....	....	Protected curb	79,040	.90	.....	....	.....	....
Rankin	.....	.....	....	Concrete	1,200a	.70	.....	....	.....	....
Scranton	Flagstone	7,000	1.11c	.....	.....	....	.....	....	.....	....
Tyrone	Concrete	1,000	1.25	Concrete	1,000	.50	.....	....	.....	....
	Brick	100	....	.....	.....	....	.....	....	.....	....
Wilkinsburg	Concrete	1,700	....	Concrete	7,306a	.075	.....	....	.....	....
Williamsport	Concrete	5,000	1.44	Concrete	1,600	.50	.....	....	.....	....
	Flagstone	3,000	0.90	Flagstone	4,800	0.65	.....	....	.....	....
York	Concrete	1,500	.90	Concrete	13,200	.25	Concrete	900	.....	1.80
Rhode Island.										
Pawtucket	Concrete	1,278	1.65	Granite	1,075	....	Cobble	....	1,075	....
Woonsocket	.....	.....	....	Granite	5,000	1.00	.....	....	.....	....
South Carolina.										
Charleston	Concrete	3,563	.94	Granite	38,780	.30	.....	....	.....	....
Columbia	Concrete	29,311	1.25	Concrete	30,000	.30	.....	....	.....	....
Greenville	Concrete	1,294	....	Concrete	8,631	....	Concrete	4,843	.....	....

For footnotes, see page 320.

TABLE NO. 2.—SIDEWALKS, CURBS AND GUTTERS LAID DURING 1913. (Continued.)

City	Sidewalks			Curbs			Gutters			
	Material	Sq. Yds.	Cost	Material	Lin. Ft.	Cost	Material	Sq. Yds.	Lin. Ft.	Cost
South Dakota.										
Deadwood	Concrete	300	....	Concrete	2,000	....	Concrete	1,200	.....	....
Pierre	Concrete	833	1.08	Concrete	300	.40	Concrete	....	300	.40
Rapid City	Concrete	1,365	....	.....	.....	....	.....	....	.....	....
Sioux Falls	Concrete	3,000	....	.....	.....	....	.....	....	.....	....
Watertown	Concrete	3,890	1.08	Concrete	19,600	.55	Concrete	....	18,000	.55
Tennessee.										
Chattanooga	Concrete	6,900	1.23	Concrete	10,570	.181	Concrete	....	10,500	.406
	.....	.....	....	Granite	2,240	1.07	Brick	500	.....	2.66
Clarksville	Concrete	6,444	1.125	Concrete	8,286	.125	Concrete	....	8,919	.34
Johnson City	Concrete	14,467	1.08	Concrete	22,595a	.40	.....	.....	.....	....
Memphis	Concrete	84,976	....	Concrete	64,500	.24	Concrete	25,000	.....	1.14
	.....	.....	....	Granite	76,137	.425	.....	....	.....	....
Knoxville	.....	.....	....	Concrete	5,902	.45	Concrete	....	1,057	.35
	.....	.....	....	Flagstone	404	.25	.....	....	.....	....
Mt. Pleasant	Concrete	2,361	1.125	Concrete	215a	.40	.....	....	.....	....
Texas.										
Dallas	Concrete	63,027	1.00	Concrete	84,727	.40	Concrete	....	63,316	.30
Fort Worth	Concrete	12,168	1.125	Concrete	23,494	.30	Concrete	3,218	14,483	1.35b
Marshall	.....	.....	....	Concrete	2,000	.37	.....	....	.....	....
Mineral Wells	Concrete	2,500	1.125	Concrete	4,000	.35	Concrete	....	2,000	.25
Paris	Concrete	11,000	.52c	Concrete	15,000	.40	Concrete	....	17,000	.37
Port Arthur	Concrete	5,000	1.62	Concrete	18,000	.45	.....	....	.....	....
San Angelo	.....	.....	....	Concrete	10,000	....	.....	....	.....	....
Sulphur Springs	Concrete	2,600	....	Concrete	1,000	....	.....	....	.....	....
Waco	Concrete	27,550	1.035	Concrete	69,500	.35	Concrete	....	26,000	.33
	.....	.....	....	Concrete	22,000a	....	.....	....	.....	....
Wichita Falls	Concrete	1,500	.30c	Concrete	10,000	.30	Concrete	....	10,000	.30
Utah.										
Lehi	Concrete	20,500	.87	.....	.....	....	.....	....	.....	....
Ogden	Concrete	14,000	.90	Concrete	22,400	.45	Concrete	....	22,400	.50
Salt Lake City	Concrete	85,000	.65c	Concrete	66,600a	1.10	.....	....	.....	....
Vermont.										
Barre	Concrete	1,207	1.02	Granite	2,565	.35	.....	....	.....	....
Bennington	Concrete	4,000	1.00	.....	.....	....	.....	....	.....	....
Burlington	Concrete	9,688	.9775	Concrete	7,085	.37	Concrete	....	3,353	.9775b
Virginia.										
Danville	Concrete	34,000	.90	.....	.....	....	.....	....	.....	....
	Cement block	22,500	.75	.....	.....	....	.....	....	.....	....
	Brick	51,000	.75	.....	.....	....	.....	....	.....	....
Newport News	Concrete	5,550	1.00	Concrete	22,000a	.43	.....	....	.....	....
Portsmouth	Concrete	2,188	.99	Granite	1,274	.70	Granite	444	.....	2.10
Pulaski	Concrete	5,000	.95	Concrete	6,000	.15	Concrete	....	6,000	.18
Suffolk	Concrete	1,900	1.00	.....	.....	....	.....	....	.....	....
Washington										
	Concrete	18,000	.86	Concrete	17,500	.29	.....	....	.....	....
	Concrete	3,774	1.15-1.18	Concrete	243	.45	.....	....	.....	....
Hoquiam	.....	.....	....	Wooden curb & gutter	6,520	.147-.154	.....	....	.....	....
Centralia	Concrete	25,859	0.85	Concrete	26,470a	.55	.....	....	.....	....
Ellensburg	Plank	900	.40	Armored concrete	3,150a	.80	.....	....	.....	....
No. Yakima	Concrete	1,104	1.17	Concrete	10,142	.36-.75	.....	....	.....	....
Pullman	Concrete	1,600	.90	Concrete	23,000	.40	Concrete	....	1,000	.28
Renton	.....	.....	....	Concrete	8,760	.35	.....	....	.....	....
Seattle	Concrete	184,291	.90	Concrete	125,165	.30	.....	....	.....	....
South Bend	Concrete	6,830	.108	Concrete	6,000	....	.....	....	.....	....
Spokane	Concrete	53,417	.90	Concrete	99,158	.36	Concrete	....	37,488	.60
Tacoma	Concrete	67,379	....	.....	.....	....	.....	....	.....	....
Vancouver	Concrete	35,000	.90	Concrete	60,700	.30	.....	....	.....	....
Walla Walla	Concrete	14,000	1.10	Concrete	2,400a	.60	.....	....	.....	....
West Virginia.										
Bluefield	Concrete	3,780	1.485-1.80	Concrete	13,000a	.60	.....	....	.....	....
Charleston	.....	.....	....	Concrete	3,000	.31	Concrete	....	1,717a	.35
Moundsville	Concrete	2,000	1.17	Wood	5,142	.13c	.....	....	.....	....
Parkersburg	Concrete	19,000	1.10	Concrete	18,500	.32	.....	....	.....	....
Wisconsin.										
Appleton	Concrete	14,415	1.08	Concrete	15,868a	....	.....	....	.....	....
Beloit	Concrete	60,000	.76	Concrete	26,000	.30	Concrete	....	26,000	.25
Burlington	Concrete	300	....	Concrete	3,650	....	.....	....	.....	....
Columbus	Concrete	2,070	.90	.....	.....	....	.....	....	.....	....
Eau Claire	Concrete	3,440	.63	Concrete	7,500	.17-.20	Concrete	....	6,400	.18
Green Bay	Concrete	15,000	.13c	m	....	....	m	....	.....	....
Janesville	Concrete	12,000	....	Concrete	24,240a	....	.....	....	.....	....
Lake Geneva	Concrete	2,400	.99	Concrete	270	.25	Concrete	....	120	.25
Marinette	Concrete	15,000	.80	.....	.....	....	.....	....	.....	....
Merrill	Concrete	8,800	.54	Concrete	5,400	.22	Concrete	....	4,200a	.32
Neenah	.....	.....	....	Concrete	10,137a	.40	.....	....	.....	....
Oconto	Concrete	6,033	.675	.....	.....	....	.....	....	.....	....
Oshkosh	.....	.....	....	Concrete	26,969a	.50	.....	....	.....	....
Richland Center	.....	.....	....	Concrete	3,200a	.68	.....	....	.....	....
Sheboygan	Concrete	10,000o	.90	Concrete	12,384a	.53	.....	....	.....	....
	.....	.....	....	Stone	4,000	.62	.....	....	.....	....
South Milwaukee	.....	.....	....	Concrete	8,000	....	Concrete	....	8,000	....
Superior	Concrete	25,000	.96	Concrete	10,000	.60	.....	....	.....	....
Waukesha	.....	.....	....	Concrete	23,000a	.49	.....	....	.....	....
Wauwatosa	Concrete	8,000	1.04	Concrete	50,000a	.43	.....	....	.....	....
West Allis	.....	.....	....	Concrete	47,470a	.55	.....	....	.....	....
Wyoming.										
Laramie	Concrete	5,090	.60c	Concrete	566	.36	Concrete	....	1,159	.38
Canada.										
Brantford, Ont.	Concrete	18,000	1.08-1.35	.....	.....	....	.....	....	.....	....
Kingston, Ont.	Concrete	9,490	1.44	Concrete	1,615	....	Concrete	6,987	.....	....
	.....	.....	....	.....	.....	....	Concrete	4,627a	.....	....
London, Ont.	Concrete	9,297	1.17	Concrete	21,866a	.4435	.....	....	.....	....
Port Arthur, Ont.	Concrete	5,653	2.00	Concrete	2,551a	.75	.....	....	.....	....
	.....	.....	....	Flagstone	8,263	.40	.....	....	.....	....
St. Catherines, Ont.	Concrete	18,000	1.06-1.26	Concrete	50,280a	.60	.....	....	.....	....
Saskatoon, Sask.	Concrete	33,474	1.548	Concrete	64,934	.32-.35	Concrete	....	13,480	.35-.38
Sault Ste Marie, Ont.	Concrete	12,000	1.305	.....	.....	....	.....	....	.....	....
Stratford, Ont.	Concrete	8,200	.45c	Concrete	11,100	.40	.....	....	.....	....
Toronto, Ont.	Concrete	193,333	1.35	Concrete	350,705	.40	.....	....	.....	....
Vancouver, B. C.	Concrete	38,750	.99	Concrete	17,739	.50	.....	....	.....	....
Winnipeg, Man.	Concrete	44,296	2.00	Concrete	58,179a	.70	.....	....	.....	....
	Plank	30,000	.50-.60	Wood	1,652	.35	.....	....	.....	....

a—Combined curb and gutter.
b—Per square yard.
c—Per lineal foot
d—Per lineal foot of 6-foot walk and including curbs.
e—Plus excavation.
f—"Armored" concrete.
g—Includes gutter.
h—Contract price; municipal work costs average $1.57.
i—Alley crossings.
j—$28.90 to $30.40 per M.
k—Also includes tile made with concrete.
l—Relaid.
m—Included in paving contract.
n—Includes excavation and 8 inches of concrete.
o—By city; does not include large amount laid by property owners.
p—Does not include cinder foundation and excavating by city.
q—In addition, 62,250 feet of old curb was redressed and reset at $0.725.
r—For gravel and granite respectively.

CITIES IN WHICH NO WORK WAS DONE IN 1913

(*Continued from page 315.*)

Minnesota.—Eveleth, Faribault, Lake City, Mankato, Montevideo, Owatonna, Red Wing, St. Cloud, St. Peter, Thief River Falls.
Mississippi.—Bay St. Louis, Columbus, Port Gibson.
Missouri.—Brookfield, Carthage, Cameron, Maryville.
Nebraska.—Blair, Chadron, Havelock, Holdrege, McCook, Red Cloud, Wahoo, Wymore.
New Hampshire.—Milford, Portsmouth.
New Jersey.—Burlington, Bridgeton, Harrison, Ventnor City.
New York.—Canajoharie, Corning, Fairport, Gloversville, Le Roy, Massena, Norwich.
North Carolina.—Gastonia, Hickory, Reedsville.
North Dakota.—Bismarck, Grand Forks.
Ohio.—Bellefontaine, Bucyrus, Delphos, East Palestine, Fairport, Lebanon, Miamisburg, Mt. Vernon.
Oklahoma.—Enid, Frederick.
Oregon.—Ashland.
Pennsylvania.—Athens, Bloomsburg, Berwick, Clearfield, Hanover, Hollidaysburg, Johnstown, Lebanon, Lewisburg, Lilly, Lock Haven, Sayre, Shamokin, Sharpsville, Titusville, Tyrone, Union City, West Berwick.
Rhode Island.—Westerly.
South Carolina.—Florence.
South Dakota.—Aberdeen, Deadwood, Huron, Mitchell, Rapid City.
Texas.—Mineral Wells, Sulphur Springs.
Wisconsin.—Ashland, Baraboo, La Crosse, Lake Geneva.
Washington.—Aberdeen.
Wyoming.—Cheyenne.

PAVING NOTES FOR 1913

Miscellaneous Items of Information as to Work Done and Methods Employed in Several Cities.

ASPHALT PAVEMENTS.

In the District of Columbia last year vitrified brick gutters were laid in connection with 2,380 square yards of sheet asphalt pavement out of a total of 23,180 square yards.

Minneapolis, Minn., laid sheet asphalt on both brick and sandstone block pavements as a base, using its own force and asphalt plant.

Toronto, Ont., laid by contract 7,827 yards of sheet asphalt on an old brick pavement.

Des Moines, Ia., used old brick pavement as a foundation for 11,349 square yards of sheet asphalt and 11,240 of bitulithic.

An asphalt pavement containing 8,700 square yards and *twenty-two years old* was resurfaced in Youngstown, Ohio.

Allentown, Pa., uses brick for the track area on asphalt streets, and last year laid 13,320 square yards of this, combined with 65,780 yards of sheet asphalt.

Rock asphalt on a 4-inch concrete base cost $1.39 a square yard, including excavation, in Arkansas City, Kansas, which laid 55,960 square yards of it by contract last year.

BRICK PAVEMENTS.

Frankfort, Ind., laid 21,393 square yards of brick on an old gravel roadway as a base, with a sand cushion.

Pekin, Ill., contracted for brick pavement with a concrete base and cement grout filler for $1.72 per square yard; the price for the concrete curb being 27 cents.

Fort Scott, Kan., used grout filler on 4,384 square yards of brick pavement, tar filler on 6,143 square yards, and laid asphalt on 17,983 square yards of 3-inch vertical fiber brick.

Boonville, Mo., paid 90 cents a square yard for brick with sand filler; $1.30 for brick with asphalt filler on concrete base and $1.02 to $1.24 when not on a concrete base.

Elizabeth, N. J., laid 6,700 square yards of brick on resurfaced macadam as a base at $1.30. Also 48,960 square yards on 5 inches of concrete with grout joints for $2.17.

Ponca City, Okla., laid 12,842 square yards of brick pavement on a 4-inch concrete base at a cost of $2.03. A 6-inch concrete pavement cost $1.11.

Tulsa, Okla., now uses brick only for gutters, concrete having proved unsatisfactory for this purpose.

Clearfield, Pa., replaced 2,700 square yards of brick on a sand foundation with the same material on concrete.

Renton, Wash., laid 16,160 square yards of brick—all of its permanent pavement work—on a foundation of brick laid flat, instead of on concrete; thus reverting to a practice which was generally discontinued several years ago.

Jacksonville, Fla., laid 69,183 square yards of brick on sand base last year, but this year's work—about 28,000 square yards—will be on a concrete base.

The Western Paving Brick Manufacturers Association reports that in the states covered by that organization, there was laid, as far as its records show, 492,157 square yards of vertical fiber brick and 488,889 square yards of standard vitrified block.

Baton Rouge, La., laid a sidewalk of brick with a cement wearing surface at a cost of 80 cents a square yard.

WOOD BLOCK.

The U. S. Forest Service reports the following quantities of wood block treated in this country during the years indicated. While these were not all used in municipal work, the probability is that by far the largest part each year was. 1909—1,140,680 square yards; 1910—1,787,600 square yards; 1911—3,865,000 square yards; 1912—2,817,900 square yards. Their 1913 figures are not yet reported.

Sheboygan, Wis., took up 12,414 square yards of cedar block laid on plank, of which we believe there is little left in this country; although at least one city, Detroit, still continues to lay new untreated wood block.

CONCRETE PAVEMENTS.

Taylorville, Ill., expects to build over 4,000 square yards of reinforced two-course concrete pavement this year.

Pocomoke City, Md., is spending $70,000 for concrete paving. A mixture of 1 cement, 2 sand and 3½ stone is used, one-course work 6 inches thick. Half-inch expansion joints are placed every 50 feet, each joint reinforced with two 4-inch channels placed back to back and the space between filled with asphalt. One-inch joints are placed along the curb. The average cut was 15 inches. The cost was $1.25 a square yard.

Bloomfield, Ia., laid 2,300 square yards of concrete in alleys, using a 1-2, 4 mixture 7 inches deep.

GENERAL.

Worcester, Mass., did all of its paving with its own forces, this including granite block, concrete, bituminous macadam, plain macadam and gravel.

Rawlins, Wyo., uses shale macadam only on its streets. Benton shale which has disintegrated in the quarry into fragments which will all pass a 4-inch screen is spread on the streets and the traffic does the rest. It is said by Engineer J. W. Wisda to be very satisfactory in a dry climate in small cities where traffic is not heavy. "Chuckholes" develop in roads made in this way, but these could be avoided by sprinkling and rolling. This shale is very plentiful in the Rocky Mountain region.

Saginaw, Mich., furnishes cement to contractors for use in concrete foundations to be built by them, this being, of course, allowed for in the bidding.

Hattiesburg, Miss., uses a pyrities rock (residue from

(*Continued on page 330.*)

TABLE NO. 3.—RESURFACING DONE DURING 1913.

City.	Sheet asphalt.	Asphalt block.	Granite, Sandstone or other stone block.	Brick or clay block.	Creosoted wood block.	Concrete.	Bitulithic.	Bituminous: Concrete.	Bituminous: Macadam.	Plain or waterbound macadam.	Gravel.	Other kinds.
Arkansas.												
Pine Bluff								25,300 a				
California.												
Oakland								4,877 b	358,500 M.c.			8,811 M.d.
Richmond	6,541 C.c.											
Colorado.												
Colorado Springs											8 M.	1 M.d.
Denver	6,400 M.e.											
Connecticut.												
Danbury									10,000 c.			
Hartford	19,701 e.											
New Haven	4,771 C.c.											
Dist. of Columbia.	48,000 C.e.											
Florida.												
Jacksonville									1,540 M.f.			
Georgia.												
Macon				10,669 C.g.								
Savannah	3,276 M.e.			12,635 M.e.								
Illinois.												
Chicago								4,785 C.c.				
Lake Forest								3,000 C.h.				
Harvey								15,000 c.				
Springfield	180 M.e.			1,000 M.								
Waukegan				6,750 C.h.								
Indiana.												
Fort Wayne	6,896 e.			12,400 i.								1,200 k.e.
Hammond				972 C.e.								13,858 j.e.
Huntington												
Muncie										27,866 M.e.		
Washington										21,900 e.		
Iowa.												
Cedar Rapids	43,100 C.e.							13,244 C.f.				
Davenport								4,000 h.				
Des Moines	26,811 e.f.						11,240 f.					
Fort Dodge	610 C.e.				200 M.e.							
Sioux City				10,000 C.e.	13,000 C.e.							
Kansas.												
Chanute												158,400 C.d.
Independence				4,200								
Kansas City									3,852 c.			
Parsons				8,000 C.e.								
Wichita	12,798 e.											
Kentucky.												
Lexington	12,500 C.c.								1,800 M.e			
Newport												
Maine.												
Bangor					2,614 g.							
Portland									3,942 M.l.			
Maryland.												
Westminster	13,780 C.c.											
Massachusetts.												
Andover									20,000 M.e.			
Boston	20,615Ce		101,718M.Ce	285C. e	2,229C. e				170,000 M. c.	250,000 M. e.		
Fall River	2,939 C.e.											
Lynn												
New Bedford			3,350 C.e.			2,325 M.m.				142,489 M.h.		
Springfield			7,582 C.e.					24,315 M.c.				
Waltham										10,800 M.c.		
Worcester										22,191 e.	46,799 e.	
Michigan.												
Detroit	138,605 n.		13,141 n.	83,944 n.	165,645 n.							
Grand Rapids	12,976 e.	6,092 g		2,645 g.				10,039 g.				
Hamtramck					12,000 C.e.							
Kalamazoo								5,975 C.h.				
Lansing								12,809 M.c.				
Saginaw	5,110 C.m.p								1,200 h.	8,600 M.h.		
St. Joseph												
Minnesota:												
Duluth					10,229 C.c.							
Minneapolis	11,279 M.f.g				23,881 M.m.r.p.							
Mississippi												
Columbus												12,000 d.
Missouri.												
Clinton									1,500 C.			
Montana.												
Bozeman							500 C.					
Nebraska.												
Lincoln	275 C.m.	1,074 C.g.										
Omaha	4,389 C.m.p			26,386 C.m.p. n.								

New Hampshire												
Berlin								20,286 C.e.	13,000 M.c.			
New Jersey												
Bridgeton				400 C.		1,400 C.					10,000 M.	
Long Branch							68,000 C.g.					
Summit										18,000 M.		
Trenton	8,184 C.m.g.		888 C.r.	18,740 C.m.								
New York												
Binghampton							12,206 C.g.					
Buffalo	71,385 C.e.g.r.											
New York City												
Bronx Boro			48,655e									
Brooklyn Boro.	130,122 M.C.											
Queens Boro.	4,812		58,832						203,170	33,353		
No. Tonawanda				6,500 C.e.								
Oneonto									1,500 M.e.			
Plattsburg									2,366 M.b.h.			
Rochester	13,797 c.m.r.						6,400 g.					
Schnectady								1,150 g.				
Syracuse	53,479 C.e.											
Utica	11,963 c.e.						42,440 g.	12,085 g.				
White Plains									10,000 h.			
North Carolina												
Greensboro								12,217 C.h.				
Ohio												
Ashtabula		2,370 M.e.										
Cincinnati	19,339 C.m.		8,559 C.m.		3,968 C.m.				82,125 M.			
Cleveland	33,215 C.e.											
Sandusky	19,000 l.			9,500 s.								
Youngstown	8,700 C.e.											
Oregon												
Portland					12,107 C.		367 C.h.					
Pennsylvania												
Allentown								19,027 C.h.				
Berwick				29,000 M.								
Bradford				900 M.e.								
Chambersburg										2,130 M.		
Clearfield				2,700 e.								
Easton				292 M.e.								1,753 M.t.c
Edwardsville				250 C.e.								
Erie	5,634 e.											
Harrisburg	5,226 C.m.s.											
Lancaster									26,765 c.			
McKees Rocks				16,300 M.e.								
Monongahela				4,600 C.e.								
Morristown				c.								
North Braddock				500 C.e.								
Philadelphia	104,906 C.e.									456,695 M.C.c.		
Pittsburg	16,388 C.g.r.u.		31,513 C.g.r.u.	7,792 C.g.r.u.	332 C.g.r.u.							
Rankin			2,800 C.e.									
Wilmerding				3,000 e.								
Rhode Island												
Providence	4,172 C.e.		4,065 M.e.									
South Dakota												
Sioux Falls			6,148C. e									
Tennessee												
Memphis	16,190 C.e.											
Texas												
Dallas												5,813 C.k
Galveston				2,882 C. w								
Utah												
Salt Lake City	2,680 C.e.r.											
West Virginia												
Moundsville				4,096e								
Wisconsin												
Ashland	1,200 M.											
Baraboo								4,000 L.				
Columbus								2,827 C.v.				
Sheboygan				12,414 C.p.								
Wyoming												
Cheyenne											20,000 M.	
Canada												
Brantford, Ont.								18,500				
St. Catherine, Ont.		1,500 C.e.										
Saskatoon, Sask.	270 C.											
Stratford, Ont.										6,300 M.c.		
Toronto, Ont.	35,825 M.C.e.f.											

a—Replaces gravel; b—On old Concrete pavement as base; c—Replaces waterbound macadam; d—Oiling waterbound macadam; e—Same surface renewed; f—On old brick pavement as foundation; g—Replaces sheet asphalt; h—On old macadam as base; i—Replaces rock asphalt; j—Tarvia macadam; k—Westrumite; l—Replaces bituminous concrete; m—Replaces brick; n—Replaces cedar, brick, granite and cobble; o—Untreated wood block; p—Replaces untreated wood block; q—On sandstone pavement as base; r—Replaces stone block; s—Replaces asphalt block; t—Amiesite; u—Replaces cobble stone; v—Replaces concrete with bituminous top. w—Replaced creosoted wood block. C—By contract. M—By municipality by force account.

TABLE NO. 4.—WORK CONTEMPLATED FOR 1914.

City	Sheet Asphalt	Asphalt Block	Granite, Sandstone or Other Stone Block	Brick or Clay Block	Creosoted Wood Block	Concrete	Bitulithic	Bituminous Concrete	Bituminous Macadam	Plain or Waterbound Macadam	Gravel	Other Kinds
Alabama												
Gadsden								40,000*				
Arizona												
Phoenix							150,000					
Arkansas												
Fort Smith				30,000*	3,250*	76,500†						37,000 a.b.
Marianna										8,900†		
Pine Bluff								80,000*				
California												
Anaheim	40,000*											
Los Angeles	32.0*			1.2*		4.0*	2.0*			6.0*	28.0*	3.0*
Oakland	3.0								20.0			12.0
Ontario						37,546				21,120		3.50m
Oxnard									21,600			
Palo Alto												64,000 c.
Pomona												9.5* c.
Porterville								23,000				
Richmond				20,000*			210,031*					230,206*b
Santa Ana	90,000											
San Mateo												100,000* c.
Santa Barbara	104,812*											
Watsonville									20,000*			
Colorado												
Colorado Springs											10.0†	2.0 d.
Denver	26,000†		23,500*	7,150*				28,296*	82,070*			
Grand Junction						25,000						
Longmont						20,000				20,000		
Connecticut												
Ansonia			18,000*		9,500*							
Bridgeport			20,000*		7,200*			60,000 c.				
Derby			3,000		10,000							
East Hartford										7,000		
Greenwich						6.0						
Hartford	1.0											
Killingly										7,780		
Meriden										25,000		
New Britain					120,000* g.					54,000†		35,000* f.
New Haven	120,000* g.								120,000*			
Putnam									3,000*			
Wallingford						12,000*			12,000†			8,000† h.
Delaware												
Wilmington												112,000 a.
Dist. Columbia.	70,000*	6,000 c				13,000*		7,000*		35,000†*		
Florida												
Clearwater				8,000								
Gainesville				4,000		2,000						
Jacksonville				63,466*		4,826*			12,000			26,141* c.
Sarasota				1.8†								
Georgia												
Americus												35,000 a.
Macon						25,000*						
Savannah			25,000									30,000 a.
Idaho												
Lewiston										7,500	7,500	
Moscow						50,000						
Pocatello												123,000* a.
Sandpoint												0.75 a.
Wallace							18,000					
Illinois												
Aurora	65,000			12,000								
Bloomington				60,000								
Casey				4,118								
Chicago Heights				57,555								
Elgin				41,744				55,594	43,000			
Galesburg				56,471*								
Galva				26,250*								
Greenville				5,300*								
Harvey				123,000		9,390						
Jerseyville				5,000*								
Kankakee				30,000*								
Lake Forest				32,000				36,000				
Moline	25,000*			66,000*	6,000*	6,000*						
Monmouth				40,000*								
Mt. Carmel				30,000								
Mt. Vernon				40,000*								
Murphysboro				13,000*					46,000*			
Normal				20,000*								

Oak Park	43,628			15,924				130,061				
Pana				34,320*								
Paris				20,000*								
Rockford				62,690*						50,375*		
Springfield				100,000								
Taylorville				41,622*		4,362*						
Urbana				30,000								
Waukegan				14,000*		7,500		10,000				
White Hall				80,000								
Indiana												
Bloomington				18,000*								
Bluffton	47,000											
Fort Wayne	39,904			21,881				14,346				
Frankfort				18,000							10,000	
Greencastle									6.0			
Huntington				450*		900*						
La Porte				23,000*								
Noblesville												1.2 a.
North Vernon						8,000						
Portland	10,550*											
Richmond				13,000*		6,200*				1,000*		
South Bend				30,000				4,580				
Terre Haute	0.75			12.0	0.75	10.0						
Iowa												
Algona								35,000				
Bloomfield						1,100		15,000				
Chariton				1.								
Clinton				16,200*								
Corning				15,000								
Davenport	10,000*			28,000*		30,000*						
Fort Dodge					25,000			40,000				
Oskaloosa				1.0*								
Perry						10.0						
Sioux City				2,000		180,000		5,600				
Winterset						1,800						
Kansas												
Abilene								20,000*				
Arkansas City	35,000*											
El Dorado								2,700				
Chanute				18,000								
Fort Scott				28,000								
Huchinson				10,000								
Junction City								50,000				
Leavenworth				13,650*		5,750*						
McPherson								37,000				
Manhattan								63,000				
Ottawa				2,300					11,700			
Pittsburgh				52,250*		5,840*						
Salina												30,000 a.
Topeka				52,000*				35,000*				
Kentucky												
Dayton										4,000		
Highland									8,000			
Hopkinsville							10,000					
Middlesboro									200,000			
Lexington	85,000*			10,000*								
Morganfield				3.0*								
Paducah											0.54	
Louisiana												
Lake Charles				63,000				34,000				
Maine												
Calais									4,200†			
Lewiston									11,000†			
Portland		4,514†				1,390*			7,648†		3,309†	6,500* c.
Maryland												
Baltimore	352,000		44,000	176,000	8,800							
Hagerstown		6,222†										
Pocomoke City						12,000*						
Westminster										8,500†		

For footnotes, see page 329.

TABLE NO. 4.—WORK CONTEMPLATED FOR 1914. (Continued.)

City	Sheet Asphalt	Asphalt Block	Granite, Sandstone or Other Stone Block	Brick or Clay Block	Creosoted Wood Block	Concrete	Bitulithic	Bituminous: Concrete	Bituminous: Macadam	Plain or Waterbound Macadam	Gravel	Other Kinds
Massachusetts												
Adams						3,330†						
Andover			4,000						15,000	6,700		
Brookline					8,800							
Lowell			25,000			10,000			25,000		40,000	
Lynn						43,500						
Southbridge					7,300*				8,000*			
Springfield			6,000†	2,000†	25,000†	9,000	18,000*	25,000†	130,000†	15,000†	7,000†	
Waltham									9,165†	5,890†		
Westfield								20,000				
Michigan												
Ann Arbor						25,000†						
Battle Creek				46,300		2,000		14,500				
Grand Rapids				40,000		6,000		25,000			50,000	
Grosse Point					0.75							
Hamtramck						4.0						
Hillsdale								1,650				
Holland								10,000				
Kalamazoo				14,000*				19,000*				
Lansing								45,000†				
Pontiac								2.0				
Saginaw	30,000											
Sturgis				15,000								
Minnesota												
Bemidji						17,000						
Crookston												7,000 j.
Duluth												6.5 a.
Erelith					13,000*							
Faribault					26,500*	1,000*						
Mankato						20,000						
Minneapolis	25,000†				175,000†	60,000†		16,000†				
Owatonna					8,500*						4.0†	
Red Wing			2,000†	700†	7,200†	7,200†						
Rochester					13,000			13,000				
St. Cloud						25,000						
St. Paul	23,588 e.		6,000	20,000	242,027	3,000		8,780				
Stillwater						0.5				1.0		
Winona				4,478*		4,500*						
Missouri												
Boonville				15,000		14,000						
Cameron				2,020		6,173						
Cape Girardeau						55,000*						
Clinton							13,000					
Columbia						7,015*						
De Soto						4,320				12,110		
Jefferson						50,000						
Kirksville	16,500*			5,000*		18,000*						
Kirkwood												4.0 a.
Mexico				4,200*								
Nevada				6,000					6,000			
Palmyra									8,000*			
Poplar Bluff								40,000				
Sedalia	15,000* e.			10,000*					500†			15,000*c
Trenton				500		14,000						
Montana												
Billings												50,500 a.
Bozeman							50,000*					
Butte							24,123*					
Great Falls						3,119*	108,308*					
Missoula						621*	27,705*					
Nebraska												
Fremont				11,000								
Havelock				10,000								
Lincoln	10,000*			10,000*			60,000*					
Norfolk								30,000		5,000		
So. Omaha				42,300*		14,100*		70,500*				18,200* c.k.
New Hampshire												
Laconia						3,000			5,000†			

New Jersey												
Bayonne	50,000											
Bridgeton											15,000†	
Camden	12,000†		50,000*	1,000*								
Long Branch											50,000	
Metuchen										8,000		
Millville				500†							58,660†	
Newark	75,000*		145,000*	50,000*	75,500*		40,000*					
Passaic	22,960*											
Rutherford				30,000								0.05*h
Summit								3,000		10,000		
Trenton	10,000*			8,000*				40,000*				
Ventnor City	1,000*											
Westfield										20,000*		
West New York		10,000	2,000									
New York												
Albany	19,560	3,000	68,890	83,320								
Binghamton				26,000	1,650	10,000	14,000					
Buffalo	245,336*		11,198*	31,343*								
Carthage								2,400				
Corning				26,034*								
Cortland				13,000		3,500		4,500				
Dunkirk	14,231					3,581						
Elmira				66,540*								
Fairport				5,250*								
Fulton			8,800			30,400						
Gloversville				3,720		2,850						
Hornell				3,800*								
Hudson				25,000								
Jamestown		1,450†		50,000†								3,000†*
Little Falls				2,500*			12,000*	2,500*	2,500*	10,000†		
Lockport		14,233*		13,065*								
Massena				35,000								
New York City												
Brooklyn Boro	606,800		180,954		17,000							5,700 l.
Manhattan Boro	320,000*	7,000*	225,000*		120,000*							
Niagara Falls												300,000 a.
No. Tonowanda				6,200*								
Norwich				16,000*								
Ogdensburg				30,490*								
Oneonta				1,000†								
Plattsburg				9,000*								
Schenectady			5,000					100,000				
Solvay				15,406*						7,188*		
Syracuse	21,390		21,790	61,380					14,100			
Utica	8,000			800			13,000	5,000	10,000			
North Carolina												
Greensboro								20,000			30,000	
Monroe										4,000		
North Dakota												
Minot											10,000	
Williston											2.0*	
Ohio												
Ada				1,350*								
Ashtabula				4,300								
Bucyrus	10,000											
Cambridge				15,000*								
Chillicothe				4,580*								
Cincinnati	8,020*		210,346*	86,065*	43,900*			31,250*		8,970*	29,800*	9,050
Cleveland			104,425	366,000				33,564				
Dayton				70,000*	16,000*	5,000*						
Delaware	6,000*			15,000*	6,000*							
Delphos				20,000								
East Liverpool				14,821*								
Fostoria	7,000			10,000		3,300				3,710		
Fremont				12,000*								
Galion												1.1a
Greenville				3,740*								
Lebanon				20,000								
Lima				9,252*				4,032*				
Lorain			1,200					38,000				
Marion		11,650		49,000								
Massillon				250,000							2,500	

For footnotes, see page 329.

TABLE NO. 4.—WORK CONTEMPLATED FOR 1914. (Continued.)

City	Sheet Asphalt	Asphalt Block	Granite, Sandstone or Other Stone Block	Buck or Clay Block	Creosoted Wood Block	Concrete	Bitulithic	Bituminous: Concrete	Bituminous: Macadam	Plain or Waterbound Macadam	Gravel	Other Kinds
Ohio (Continued)												
Mt. Vernon				9,300* g				9,300* g			5,000†	
Newark				16,000*								
Norwood			1,000		10,000	20,000	5,000					
Painesville				26,400								
St. Marys				15,000								
Sandusky	6,000			20,000		2,000						
Willoughby				5,850*								
Oklahoma												
Lawton										8,800		
Okmulgee				a.i.				5.0				
Tulsa	56,000			3,000								
Oregon												
Astoria				45,000* g	45,000* g	45,000* g	45,000* g					
Eugene							11,600*	12,044*				
Portland	7.0*		0.2*		12,000*	11.0*	2.0*	4.0*				
Pennsylvania												
Allentown	70,000*		1,800*					30,000*				
Bradford				7,000								
Catasauqua								2,500				
Chambersburg			15,000†									
Chester								100,000				
Clearfield				2,000								
Connellsville				9,000								
Corey				12,500								
Du Bois				5,300		3,800						
Gallitzen				5,000								
Grove City				4,000				8,000				
Hanover								12,000				
Harrisburg	50,000*											
Hazleton				1,420				12,290				
Homestead				1,000								
Kingston				10,000								
Larksville				1.0								
Lilly				10,000*								
McKees Rocks			6,500 g.			6,500 g.						
Meadville			69,000*									
Monongahela			3,000*									
Norristown			i.									
No. Braddock				3.0								
Oil City				20,500								
Pottstown				1,700†								
Rankin			1.0									
Scranton	94,596		1,177									
Shenandoah	20,000											
West Berwick				19,557								
Wilkinsburg				10,000*								
Williamsport				25,000*								
York												27,000 a.
Rhode Island												
Providence	14,890						36,230					
Woonsocket			5,000									
South Carolina												
Charleston												35,000 a.
Columbia	2.0			0.5								
South Dakota												
Pierre											9,000†	
Sioux Falls												50,000a
Watertown						2,830		30,000				
Tennessee												
Clarksville				11,000								
Johnson City	16,552											12,000 a.
Knoxville												14,710 c.
Memphis	20,855*			11,059*				20,000*			34,522*	
Mt. Pleasant											3.0	

Texas												
Abilene									35,000			
Dallas					36,674		68,307	7,335				28,963
Fort Worth				29,000		3,400		29,000				
Galveston				95,138*		19,683*						86,399n
Mineral Wells												100,000 a.
Paris						6,500		12,000	16,000	25,000		22,000
Sulphur Springs												35,000 a.
Waco				12,000*			80,000*				20,000*	
Wichita Falls						2,000						
Utah												
Ogden	41,406*					9,223*						
Salt Lake City	64,000					1.0	2.5					
Vermont												
Barre									5,000			
Burlington				2,455					4,176			
Virginia												
Newport News									11,200†	1,500†		
Pulaski						3,000						
Suffolk						6,000†						
Washington												
Centralia						20,000						
Hoquiam					1,200			25,000				
No. Yakima								9,679		2,984		
Pullman							28,000 g.	28,000 g.	5,000			
Renton				9,000								
Seattle	160,000		3,000	135,000		4,300						
South Bend						13,000						
Spokane		110,000										
Tacoma	120,000g					9,000		120,000 g.				
Vancouver							20,000*				10,000*	
West Virginia												
Bluefield								50,000*g	50,000*g			
Parkersburg				50,000*		23,000						
Wisconsin												
Appleton												25,000 a.
Ashland	600†											
Baraboo												6,000 h.
Beloit					60,000*							
Burlington						8,000						
Columbus												7,000* a.
Delavan								16,000				
De Pere						8,000						
Eau Claire					1,800†	4,000*			12,000†			
Green Bay												3.5 a.
Janesville				10,000					3,000*			
La Crosse				5,000*					4,222	8,000		
Lake Geneva					22,330							
Madison	25,000			20,000				60,000	30,000			
Marinette						10,000						
Merrill				10,000 g.		10,000 g.				4,000		
Neenah					3,800*							3,000* a.
Oconto										6,000		
Oshkosh							2.75					
Richland Centre						8,000*				5,000†		
Sheboygan			600	6,000		75,000						
So. Milwaukee						23,000*						
Superior	55,000*					35,000*						
West Allis	1											
Wyoming												
Cheyenne											15,000†	
Canada												
Brantford, Ont.						1.0		1.0				
London, Ont.	60,000			15,000		10,000					10,000	
Montreal, Que.	155,800		70,000	95,760	13,200			78,663				
Port Arthur, Ont.						2,000				60,000		5,000
St. Catherines, Ont.				40,000* g.			40,000* g.		16,000†			
Saskatoon, Sask.	3,996		810		7,517		712					
Vancouver, B. C.	1,346		1,815	14,622	26,331	24,836		111,897				
Halifax, N. S.			3,000				10,000					

a—Kind undecided. b—Oiled macada m. c—Concrete with bituminous top. d—Re-oiling. e—Resurfacing. f—Amiesite. g—One of these. h—Macadam with Tarvia surface. ce. l—Amount not determined. j—Westrumite. k—Vertical fiber brick. l—Iron slag block. m—Natural soil, oiled. n—Shell road. *By contract. †By municipality by force acco unt.

PAVING NOTES FOR 1913.

(Continued from page 321.)

a fertilizer factory) for a considerable part of its street surfacing.

Several cities in Ohio and Indiana report that the floods of last spring imposed such heavy expense for a general righting of things that new pavements could not be though of.

Jacksonville, Fla., laid 1,540 square yards of bituminous macadam on an old brick pavement as a base.

Cedar Rapids, Ia., laid 13,244 square yards of asphaltic concrete on an old brick pavement as a base.

SEVERITY FACTORS IN TRAFFIC CENSUS

February 10, 1914.

Editor, Municipal Journal,
50 Union Square, New York, N. Y.

Gentlemen: On page 168 of your issue for February 5th is printed Col. Sohier's paper on "The Need of Traffic Records." May I call your attention to some remarks under the head of "Traffic Generally," printed in "The Surveyor" (London) for January 30th, pages 156 and 157, and especially to the statements there made concerning the needs now of "doing away with weights except for purposes of comparison within the limits of each class in itself" and of assigning "to each kind of vehicle a severity factor." (See extracts below.)

I might also invite your attention to an article by me on "The Simplification of Traffic Records for Purposes of Comparison," printed in the Surveyor for March 10th, 1911, pages 364 and 365, and in Municipal Engineering for March, 1911, page 167, etc.

Col. Sohier says "what we need is some uniform method of taking traffic counts and some uniform formula that will fairly represent the weight or damage done by different kinds of traffic based upon the weight per yard width per year, or per day, so that we can compare results. * * * The English Road Board has adopted an assumed weight for various vehicles and many traffic statistics based upon this formula have been made and are now available in various reports."

The point I wish to make is that I think such a publication as yours can do highway engineers an enormous amount of good by bringing to their attention the desirability of teaching general agreement at the earliest possible date on a uniform traffic census form and a set of "severity factors" so that comparisons of records may be assumed and readily made. It seems to me that if these were had, it would then be possible to arrive at many conclusions of the greatest importance, but which are now difficult, if not impossible, because of the haziness or uncertainty of the traffic factors.

The Special Committee of the American Society of Civil Engineers (on "Bituminous Materials for Road Making," etc.), some years ago established a form for recording traffic censuses, but is now considering a revision of this form. At that time (1909) the matter of "severity factors" was not included by the Committee, but with the present revision of the Committee's forms now under consideration, it will undoubtedly come up again. If, therefore, the matter could be brought to the attention of highway engineers through such a medium as the Municipal Journal and the Committee advised of the opinions of engineers in the matter, it would be glad to render such assistance in this connection as it might be able. Will you not give the matter your consideration, acting of course as you think best in it.

Very truly yours,
W. W. CROSBY.

Extracts from Editorial in the "Surveyor" referred to.

What is now needed is to do away with the weights except for purposes of comparison within the limits of each class in itself, and to assign to each distinct kind of vehicle a "severity factor." This severity factor will be arrived at by combining two factors, one for the class of vehicle and one for the actual weight; thus, if a motor delivery van belongs to a class with a factor of 6, and the individual vehicle has a weight unladen of 3 tons, and a weight laden of 6 tons, the severity factor for that vehicle would, for general purposes, be 27, being based on a gross load of 4½ tons. Where it is clear that the vehicle is usually fully laden when passing the census station on its outward journey, and is usually empty on the homeward journey, the proper factors, 36 and 18, respectively, could be applied.

A list of factors suitable for a main road with a bituminous bound crust is not at all suitable for limestone or sandstone crusts on secondary and by roads in country districts. If, for example, we compare the ordinary motor omnibus with a slow-moving, iron-tired motor wagon on wood pavements, the severity factors might be about the same, or that of the motor wagon somewhat the greater, but on a good, strong, water-bound macadam road the motor omnibus would be twice or three times as severe as the motor wagon. The relations between width and traffic must be carefully studied as a part of the study of highway economics.

The total severity of the traffic on a road is not the sum total of the separate effects of the different elements forming that traffic. It may be that in a few cases different forms of traffic accentuate each other's ill-effects, but it is more often the case that different classes of traffic mitigate each other's punishment of the road. It is not easy to express quantitatively such influences as these; we can only take them into account by way of comment on our numerical results.

Another elusive factor is the distribution of the different classes of traffic over the seven days of the week and the twenty-four hours of the day; and the mere fact that the whole of the traffic occurs during the same week does not necessarily imply that it may be regarded as mixed traffic in its effects on the road. The manner in which motor vehicles, for instance, wear a road depends very much upon the amount of other traffic which is present on the same day, and in some cases a large number of vehicles may pass a given spot without deviating more than a very little from the centre of the road.

DIFFICULTIES WITH A GROUND WATER SUPPLY.

Lowell, Mass., has obtained its water supply from wells since 1893. One system of wells was driven in that year and another in 1894. The supply was at first satisfactory, but in 1895 the State Board of Health found the supply from the first set to be high in ammonias and iron, and in 1898 there were several cases of lead poisoning which the state board attributed to the fact that there was more carbonic acid in this water than in any other in the state. This system was therefore abandoned and a larger amount pumped from the second system, which was extended in 1900 by driving 177 additional wells and 118 more in 1911. With additional draught upon this source of supply, it was found that the amount obtainable was lessening and also that it was carrying higher percentages of iron; in fact, that the diminishing capacity of the wells was due to deposits of organic matter and iron in the well points and the surrounding ground. Adding the last set of wells reduced the iron content 90 per cent, but in a few months it again began to rise and the amount of water obtainable to diminish, and it seems probable that before long a new source of supply must be obtained. The increase of ammonias and iron content with the increased draught upon the supply is believed to be due to the overworking of the ground, which acted as a filter in removing iron and organic matter.

COST OF WATER MAINS.

The Water Department of Wilmington, Del., during the last fiscal year laid with its own force 8,060 feet of mains, at average cost as follows: 12-inch—material, $1.429 per foot; labor, 56.2 cents per foot. 8-inch—78.7 cents per foot for material and 49.2 cents for labor. 6-inch—58.6 cents per foot for material and 37.8 cents for labor. 4-inch—41.3 cents for material and 23.4 cents for labor.

The WEEK'S NEWS

Grade Crossing Elimination in Philadelphia—Sewage Testing Station for Milwaukee—New Jersey Cities to Act on Water Purchase—Great Increase in Nebraskan Municipal Light Plants—City Manager Plan Successful in Dayton—Snow Plows Clear Streets Rapidly—City Employees Will Be Placed Under Civil Service.

ROADS AND PAVEMENTS

Would Make Post Road State Highway.

Albany, N. Y.—Representatives of those who favor the preservation of the Albany Post Road by having it designated as a state highway for its entire length from Yonkers to Albany had a hearing recently at Albany before the Senate Committee of Internal Affairs. The specific subject of the hearing was the Herrick-Fish bill, introduced by Senator W. R. Herrick and Assemblyman H. Fish, Jr., which provides that the road be designated as a state highway, to be known as "Route 1-a." The contention of those favoring the bill was that, as 60 per cent of the famous old road was at present state highway, it was only proper that the remainder be so designated; that the road was bordered by property valued at about $100,000,000; that the taxpayers along the route should not in fairness have to bear the burden of keeping the road in repair for an enormous traffic, 90 per cent of which was through traffic, and that the taking over of the whole road by the state would safeguard the future of the most important road in the state and the only direct link between New York City and the capital on the east bank of the Hudson.

Eliminate Twenty-Eight Grade Crossings.

Philadelphia, Pa.—One of the most important improvements ever accompilshed through the co-operative efforts of a city and a railway corporation finds its completion in the artistic bridge of the Reading Railway at Spring Garden street. This bridge marks the termination of a long struggle for the elimination of grade grossings. The railway company has elevated its tracks and thereby abolished twenty-eight crossings. Both parties have greatly benefited by this joint improvement; the heavy toll in human lives has been obviated and the railway can handle its traffic better and save the expense of hiring grade crossing watchmen. The city bears about 35 per cent of the total expense and the company 65. This difference is readily explained by the fact that only in such instances where the railway did not increase its facilities were the expenses equally shared. The cost of the work, it is said, will come well within the estimate, which is $7,659,740.

Will Spend Five Millions for Good Roads.

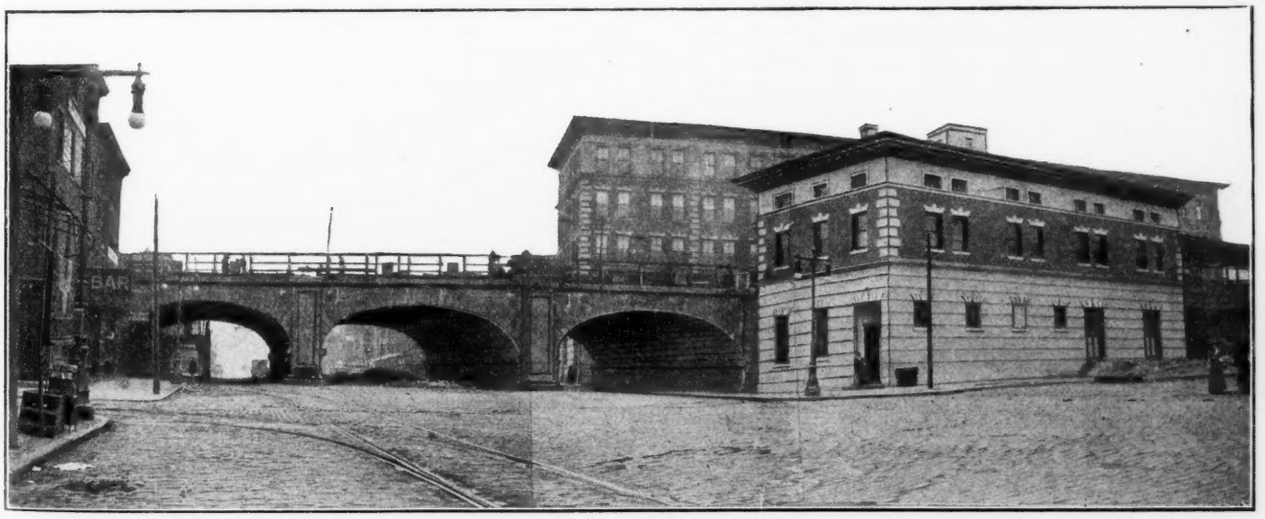
Duluth, Minn.—Ten thousand miles of permanent state road, which will be built to withstand automobile traffic and connect all the county seats and market centers of Minnesota, is the plan of the Minnesota Highway Commission, now conferring with county commissioners to select roads for construction this year by state aid. For the good roads work the state has $1,500,000 to be distributed to the counties, while the funds raised by the counties and townships in addition, it is believed, will make a total of $5,000,000 for Minnesota roads. The commission is now planning to secure the service of an engineer, who will advise the road builders and attempt to oversee every mile of road constructed.

Michigan Built 590 Miles of Road in 7 Months.

Lansing, Mich.—The State Highway Department has issued a report which shows that 590 miles of road were built since July 1, 1913. Of this amount, 551 miles were of state reward and 39 miles of the new trunk line highway system. There are now 2,344 miles of state reward roads in the state, and, with 1,754 miles built up to July 1, 1913, the record of almost 600 miles since that date is one never before equalled by the department. The department will construct twelve trunk line bridges this year. Three were built last year, one at Marquette, one in Wayne county and one in Kent county. Under the new trunk line highway law, passed at the last session of the legislature, it is necessary for a county to build three miles of trunk line highway before the state will start building a trunk line bridge. The state department uses steel and concrete in the construction of all bridges.

More Than Eight Miles Paved.

Austin, Tex.—At the close of the fiscal year December 31, Austin had 272,035.5 square yards of paved streets, according to Councilman P. W. Powell, superintendent of streets and public improvements, who is now busily en-



Courtesy Philadelphia Record.
GRADE CROSSING AT SPRING GARDEN STREET ELIMINATED BY RAILROAD BRIDGE.

gaged in making out his annual report for the past year. That section of the report dealing with streets has not yet been completed in detail form, only the total amount and the material used being shown. Attention is called to the fact that while this large amount as indicated by the figures represents only about eight miles in linear measurement, the same amount in many other cities of the state would represent many more miles if width of the thoroughfares is taken into consideration. Various materials and the amount in square yards of each follows: Wood block, streets, 11,754.7; wood block, alleys, 2,453.2; wood block, street railway, 11,980; brick, 71,132.2; concrete, 2,453.2; bitulithic, 172,262.2.

Pennsylvania May Lose State Highways.

Philadelpiha, Pa.—Because of the defeat of the proposed amendment to the state constitution authorizing a bond issue for road building, Pennsylvania may have to abandon its state highway system and turn 10,000 miles of state highways back upon the 1,200 townships from which they were taken. Under the Sproul act of 1911, the state of Pennsylvania took possession of 8,600 miles of roads that form connecting links between county seats and other important communities. In 1913, 1,400 miles were added. When the legislature created this system of main state highways, it was expected that funds for improving and maintaining the roads would be provided by a bond issue. At the election of November, 1913, however, an amendment to the constitution providing for an issue of $50,000,000 bonds was voted down, and under the terms of the constitution another such amendment cannot be voted on for at least five years. A serious problem therefore arises: either the Sproul act must be repealed or means must be devised for getting enough money out of state revenues for at least maintaining the roads in their present condition. As the legislature of 1915 will be called upon to adopt one or the other of these alternatives the Pennsylvania Good Roads Association, which is the Pennsylvania division of the National Highways Association, has undertaken an active campaign to rouse public sentiment in order that the members of the incoming legislature may be prepared to solve the problem intelligently and effectively.

Indians to Build Lincoln Highway.

Skull Valley, Nev.—Indians of Skull Valley are to build one mile of the Lincoln Highway this year. The stretch to be improved goes through the Indian farm in the center of the valley. L. R. Creel, Indian agent, who has charge of the Indians on the reservation, is promoting the plan. "Now that the Lincoln Highway has been designated through the Indian farm I intend to build a mile of model highway across this property," he said. "The road at present is far from being good for automobiles, but by the time the touring starts next spring I will have the best mile of road between Salt Lake and Ely, Nevada."

Dixon-Lincoln Highway to Be Permanent.

Dixon, Ill.—Residents of Dixon township, who are interested in Dixon's future and who hope to see this city profit by the opportunities the Lincoln highway offers, have decided that, with the consent of the voters of the township, Dixon will do its share toward the success of the great Lincoln highway and will at the same time make for Dixon an investment that will pay permanent dividends. In other words, the plan is to bond this township for the sum of $50,000 to be used in the construction of a permanent roadway, either of brick pavement or concrete, as the highway commissioners and the engineers shall elect. This pavement is to be built on that part of the Lincoln highway which lies within Dixon township, exclusive of that inside the city limits. There are between four and one-half and five miles of road that would thus be improved.

State Commission Permits Convict Labor.

Springfield, Ill.—The State Highway Commission has made known its policies for the coming year with regard to the employment by communities, of convict labor on new hard roads. Warden Allen stated that he would have 250 available men for the spring work. The expense which communities wishing the convict labor must bear will be 50 cents per capita for every laborer employed. It was also decided that the greatest saving to the State will accrue from the construction of macadam roads, for which the State will furnish crushed stone at a cost, to the community, of only the freight. The city or cities that first provide funds to meet the conditions of the State Commission, will have first call on State convict labor.

25-Mile Sand-Clay Road Near Completion.

Newton, N. C.—The Hickory-to-Maiden sand-clay road has been completed to the city limits of Maiden. Only two-tenths of a mile still remain to be built to the Lincoln county line. This now gives a stretch of 25 miles of as good a road as is to be found anywhere in this section of the state. The Lincoln commissioners have agreed to build a road to intersect with the Catawba road at the county line. This will make 45 miles of sand-clay road from Hickory to Bozzelle's Ferry, where connection is made with the Mecklenburg macadam road to Charlotte. The Newton force, on completion of the road, will be moved to one of the roads leading out from Newton.

SEWERAGE AND SANITATION

Prepare Plans for Sewage Disposal Plant.

Camden, N. J.—The Camden Council has taken another step in the controversy with the State Board of Health over the order to cease pollution of the Delaware River when it adopted a resolution directing its engineer and Street Commissioner to prepare a plan for a sewage disposal plant for submission to the State Board on June 15. The special committee which held a conference with the State Board some weeks ago recommended that an expert engineer be engaged for the work, but members of council did not deem it necessary to go to that expense, and in consequence its own salaried officials will do the work. No action has yet been taken to have rescinded the order demanding the city to cease pollution of the Delaware River. An adequate disposal system, it is estimated, would cost $3,000,000.

Will Erect Sewage Testing Station.

Milwaukee, Wis.—Chief Engineer Hatton has been authorized by the Sewerage Commission to draw up plans and specifications for a laboratory to be erected on Jones Island and to advertise for bids for its construction. The building is to be of frame construction, 22x44 feet. The station is to be erected for making tests of sewage disposal to ascertain the best means of treating the waste and rendering it harmless.

Will Construct Sewer System.

Stratford, Wis.—Stratford, a town of 600 inhabitants, located 75 miles northwest of Des Moines, won an important point in its fight to secure better sanitation when the State Board of Health approved the plan for a sewer system to be installed in that town. For several months the people of Stratford have been fighting bitterly among themselves, half in favor of the sewer system and the remainder opposed to it, says a dispatch. Backed by the State Board of Health, C. G. Peterson, mayor, and the town council passed a resolution of necessity for the improvement.

Requisites for Efficient Health Officers.

Chicago, Ill.—A public health officer to be efficient must give his full time to his public duties, it was declared here by Dr. W. C. Rucker, assistant surgeon of the United States public health service. In an addresss to the Federation of State Medical Boards, Dr. Rucker asserted that there were three requisites to thorough public health administration. "These three are the well trained, well remunerated, full-time health officer," said General Rucker. "The power behind him must be intelligent, accurate law and adequate appropriation."

Commission on Great Lakes Pollution to Meet.

Detroit, Mich.—An international joint commission that is to meet here early this month is expected to take steps that will eventually eliminate the pollution by sewage of the

great lakes. Its action will be of vital interest to every city on the lakes, whether in the United States or Canada, and all residents of both countries will be indirectly affected. The commisssion is to meet March 9. In addition to hearing discussion and evidence on the question of the level of Lake Superior it will make plans for the next step in the matter of the pollution of international waters by American and Canadian cities. It is asserted by the experts of the commission that the treaty between the United States and Great Britain regarding the pollution of these waters is being violated at every point of contact from the Lake of the Woods to the St. Lawrence. The situation has become so serious that comprehensive plans will have to be adopted and probably they will be of most drastic character.

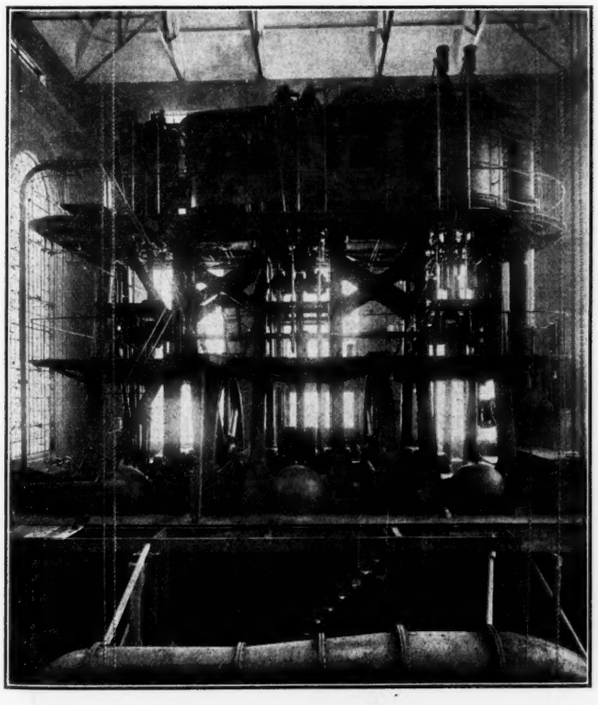
WATER SUPPLY

Denver Defeats Purchase of Private Plant.

Denver, Colo.—Although the citizens of Denver have defeated the proposition to purchase the plant of the Denver Union Water Company, it is still believed that some arrangement may be effected whereby that property may be eventually taken over by the city. This, at least, seems to be the consensus of opinion held by the Water Consumers' League. City Attorney I. N. Stevens said that the city could not treat with the water company until a responsible committee has been created by the stockholders and bondholders to handle their affairs. "This committee," stated the attorney, "must be given full authority to act by meetings of stockholders and bondholders, so that the city can count upon its actions as responsible and binding. I think an agreement can be reached in that event satisfactory to all sides."

Install 20 Million Gallon Pump.

Erie, Pa.—The water pumping station has recently been equipped with a huge 20,000,000 gallon pumping engine built by the Bethlehem Steel Company of South Bethlehem, Pa. Water Commissioner F. D. Schultz, Secretary G. Gensheimer, of the water board, and other city officials were present when the engine was submitted to its first test. When the machinery was started, the pump settled to its



Courtesy Erie (Pa.) Daily Times.
BETHLEHEM PUMP.

work, first slowly, but gradually acquiring greater speed as the piston was rapidly actuated by a steam pressure of 175 pounds. As the pressure dropped to 80 pounds the engine was forcing water through the city mains at a rate of 12,500,000 gallons per twenty-four hours.

N. J. Municipalities Will Act on Water Supply Purchase.

Passaic, N. J.—A conference between the New Jersey Water Supply Commission and representatives of nearly fifteen municipalities in the state has been held in the City Hall in Paterson for the purpose of discussing the proposed plan that the state take over the East Jersey Water Company and its subsidiaries. Although the meeting did not commit itself to any definite plan, the consensus of opinion seemed to be in favor of state ownership. Among the municipalities represented were Paterson, Passaic, Newark, Montclair, Nutley, Glen Ridge, Totowa, Hawthorne and Elizabeth. The following resolution adopted explains fully the advances towards state ownership, made at the meeting: "Resolved, That the State Potable Water Supply Commission at once draw up and present to each municipality interested a complete proposition covering the subject, showing in detail the costs to be assumed by each municipality, and an estimate of fixed charges of operation by the state commission and also secure from the East Jersey Water Company the best proposition obtainable, and that each municipality take prompt action in the matter and meet in the City Hall, in Paterson, April 3, at 1 P. M." As has been stated in a recent issue of Municipal Journal, the East Jersey Water Company has offered to turn over its plants and the plants of its subsidiaries to the state, provided that the state assume all the obligations of the company, $7,500,000 in outstanding bonds, and borrow the $1,300,000 needed for maintenance from the company. State appraisers have estimated the value of the plants at between $8,000,000 and $9,000,000.

Approve Providence Water Supply Project.

Providence, R. I.—Municipal Journal in its February 12th issue reported the proposed plans for augmenting the present water supply of Providence. These plans, looking toward the utilization of 150 square miles of territory in Kent county as a catchment area for a municipal supply and the construction of a $12,000,000 storage reservoir, have met with the approval of the Board of Aldermen and the Common Council. The city solicitor has been requested to appear before the General Assembly for the purpose of securing legislation providing the city with authority to advance its water project. Should such legislation be granted, the removal of all objectionable property from the water shed, the purchase of villages and necessary condemnation would be effected.

Expense of Operating Water Plant Cut $25,000.

Omaha, Neb.—Operating expenses of the Omaha water plant during 1913 were nearly $25,000 less than the yearly expenses of the plant under private management. The figures of the old water company do not include the $130,000 spent for taxes and legal expenses. The reduction of $2,000 a month in operating expense has been achieved with nearly double the number of meters to be read and over 2,000 more water users than were served by the water company. Another comparison in favor of the Omaha water plant was given General Manager Howell by an Omaha man who formerly lived in Denver in exactly the same-sized house as in Omaha. In Denver, with a privately owned plant, his water bill from May 1 to November 1, 1912, was $14.50. During the same period in 1913 in Omaha his water bill was only $5.76. Under the present rates the bill would have been only $4.65.

Broken Main Causes $100,000 Fire Loss.

Springfield, Mass.—A break in the city's principal water main has caused the collapse of a three-story building and was responsible for a $100,000 loss by a fire which burned out a local theatre. On reaching the theatre fire the firemen attached lines of hose to several hydrants which were found to have no water. The pressure from the other hydrants was inadequate, owing to the broken water main. A second alarm brought additional apparatus, and after several hours of hard fighting the spread of the fire was prevented.

Water Cut Off If Meters Are Not Installed.

Binghampton, N. Y.—Every residence in the city must install a water meter or the supply of water will be cut

off. This was the decision arrived at in a recent meeting of the Board of Water Commissioners. Sometime ago the Water Board passed a resolution requiring the installation of meters in all houses. Gangs of men were set at work installing the meters, taking one street at a time. It often occurred that householders refused to allow the installation of a meter or pay the fee of $10 charged for it. To remedy this and provide a penalty the Board decided on its present plan of compulsory meter installation.

STREET LIGHTING AND POWER

Inspect Lighting System of Elizabeth, N. J.

Paterson, N. J.—A delegation of citizens from Elizabeth came to this city recently to observe the general illumination of the various sections of Paterson. They were especially interested in the arc lights used in this city, and before they left Paterson they agreed that such lights should be installed in Elizabeth. The committee of citizens were entertained by Secretary J. J. Fitzgerald, of the local Board of Trade, and G. Oakley, a member of the Board of Trustees. Colonel W. H. Rogers, the local division agent of the Public Service Electric Company, joined the party and explained the lighting system of the city from a practical and technical standpoint.

Municipal Light Plants Greatly Increased.

Omaha, Neb.—Government statistics showing the growth of electric light and power stations in Nebraska the past ten years show an increase of 463.6 per cent in municipally-owned plants, and only 160.5 per cent in "commercial" establishments. A larger increase is shown in salaries and wages paid than in numbers employed and a larger increase in output than in capacity.

Purchase Light Plant.

Cherryville, N. C.—The Board of Aldermen has announced the purchase of the electric light plant here, formerly under private ownership. This plant will be municipally operated in connection with the water works plant now under construction. Current from the new plant will, it is said, be supplied at a lower rate than heretofore.

Electric Lights for Ridgeland, S. C.

Ridgeland, S. C.—The town officials have placed the poles for electric lights and they promise to have the system in working order within the next month. The machinery has been installed in the plant and all that is now necessary is the wiring. For the past six months Ridgeland has been without lights of any kind.

Will Install Nitrogen Lamps.

Hartford, Conn.—The experiment of the Hartford City Lighting Company with the new nitrogen lamps, recently constructed for the first time in the laboratory of the Westinghouse company, has not yet been completed. If the test being made proves satisfactory, the new lamps will be installed in this city to replace the arc lights now used here for street illumination.

Red Tops on Street Lamps.

Toledo, O.—Red tops will be placed on street lights in the downtown sections where street car lines cross the streets by order of President Coates of the Rail-Light. The order is in conformity with an agreement between the Rail-Light and Safety Director Kapp, whereby the former will co-operate with the city in a safety first campaign. Orders also will be given to all motormen to stop their cars immediately upon hearing the fire bell. Disregard of that order will be met with discharge.

Municipal Plant Again Reduces Rate.

Lincoln, Neb.—Lincoln's rapidly growing municipal light plant will grant its consumers another big cut in prices. Commissioner Schroeder, in charge of the department, has introduced an amendment to the lighting ordinance to permit this. The proposed price is to be 5 cents per kilowatt hour. The new rates which the city will put into effect will be nearly 4 cents per kilowatt hour cheaper than the charge made by private companies in neighboring towns. Lincoln's plant has had a wonderful growth since its installation last April. Starting with less than a hundred patrons, the plant now has as many as it can provide for and has already reduced rates twice.

FIRE AND POLICE

Demonstrate Alarm System.

Holyoke, Mass.—Representatives of the Gamewell Telegraph Police and Fire Alarm Company, of New York, have given a demonstration of the latest system in the headquarters of the local police department before officers of the department, patrolmen and members of the Fire Department. A patrol box was set up in the main office and a thorough demonstration was given, with the exception of the red light system that does not meet the approval of most policemen. The present police signal system is considered inadequate for the needs of the department. Thomas F. Monaghan, superintendent of the fire alarm system, praised the Gamewell system highly and said that the installation of such a system in Holyoke would cost approximately $20,000.

Vote to Increase Firemen's Pay.

Des Moines, Ia.—The City Council of Des Moines has authorized an increase of $10 a month in pay of city firemen, which will cost $10,000 a year. At present there is no provision for getting the money with which to meet this increase. The firemen had petitioned for the raise and were urging it hard on the candidates. As most of the council are candidates they voted the increase, except the mayor, who refused to do so.

Fire Alarm System Installed.

Watervliet, N. Y.—The contract for a modern fire alarm system for the Watervliet Arsenal has been awarded to the Gamewell Company, of New York. Ten boxes will be attached to a large horn. The new system will cost about $2,000.

Small Police Force Efficient.

Attleboro, Mass.—A comparison of the Police Departments in the city of North Adams and the town of Attleboro shows some interesting figures which prove that the local department is run on a very economical basis and does not have the money to expend that other towns of like size have. North Adams is a city with only 4,000 inhabitants more than Attleboro, yet the appropriation for salaries alone in that city amounts annually to $25,732. There is also an appropriation of $1,500 for the police expenses. These figures, compared with the $7,500 appropriation in Attleboro, show that the local town is getting along far cheaper than most places. The arrests in North Adams numbered 969, while there were over 800 in Attleboro last year. There is a chief of police in charge of the men, with two captains and 19 regular patrolmen. In Attleboro there is a chief, lieutenant and 4 regular patrolmen.

MOTOR VEHICLES

Test Motor Engine.

Camden, N. J.—Conducted under great difficulties, on account of the severe cold weather, the test of the new American La France three-in-one fire apparatus has only partially been carried out, but as far as it went it was very successful. It pumped water from the river, which was a fourteen foot lift, through three lines of hose at the rate of 900 gallons per minute. The requirement for this test is 700 gallons. This partial test was held under the personal supervision of Fire Chief Worthington, assisted by Chief of Water I. Long and the Fire Committee of City Council. The American La France Company was represented by Messrs. Hazard, Stanchard, La Brie and James Marlow, who recently installed the new hook and ladder truck. As soon as the weather conditions are more favorable the test will be completed.

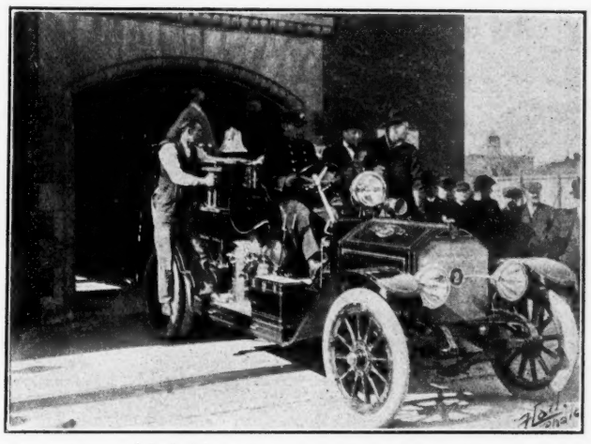
Motor Apparatus Efficient in Blizzard.

Lynn, Mass.—The motor-propelled pieces of fire apparatus of the city have been put to a severe test during the past month, when they have been up against the unusual combination of deep, heavy snow over a bottom layer of

ice. Chief Engineer Chase believes that they have more than made good, and that he now has an equipment which can plow through the deepest drifts of genuine old-fashioned New England blizzards and also reach the greatest heights at what would be top speed for the horse-drawn kit. Many times since the last storm the terrific power in the tractor engines has been demonstrated when they have gone whizzing by three-horse hitches from the fire houses, which were having all kinds of trouble in making headway. That the hills on the highlands are not too steep for the auto kit was demonstrated when the new tractor and the auto pump from Glenmere shot up many of the steepest grades.

La France Machine Resists Blizzard.

Newport, R. I.—The new American La France combination chemical and hose motor-drawn apparatus gave a good account of itself in the recent blizzard here, when it was called upon to force its way through snow and over slippery pavements in order to reach a fire. The machine has



Courtesy Newport (R. I.) Daly News.
CHEMICAL ENGINE LEAVING FIRE STATION.

space for 1,000 feet of hose, although it carries only 500 feet. Together with a Robinson and a chief's runabout, it represents the entire motor apparatus thus far installed by the Newport Fire Department.

GOVERNMENT AND FINANCE

Mayor Praises Commission Rule.

Benton Harbor, Mich.—Municipal debt problems, the troubles of street paving and improvements, many leakages under council governed cities would be eliminated should commission form of governmetn be adopted. This was the gist of the address delivered in Benton Harbor by Mayor Johnson of Pontiac. Mayor Johnson has seen Pontiac grow and improve under the plan of the commisison while under the former reign the officials were constantly in hot water over a surplus debt left from one administration to another. Under the commission rule, he said, the people vote for the man fit for the office, not for party affiliation interests. The choice muzzles the man to his job. The city of Pontiac, with its present population of over 20,000, and increased improvements, costs no more to run than when it counted 12,000 in its census.

City Manager Plan Successful.

Indianapolis, Ind.—"I do not know the politics of a single one of my appointees," said H. M. Waite, city manager of Dayton, Ohio, in addressing the seventh annual convention of the Indiana Sanitary and Water Supply Association, "All I insist on is efficiency, loyalty and economy, and their salaries are such as department heads should draw." Mr. Waite deprecated the idea of municipal reform where the outs are put in simply as a protest against the ins. Such reform never gets anywhere, he asserted, and merely reverses the situation as far as politics are concerned. In speaking of the city manager form of government as adopted at Dayton, Mr. Waite characterized it as one of phenomenal success and patterned after the plan of the private corporations, where efficiency is so much sought after. He declared under the city manager form of government public service utilities can be operated as cheaply and as efficiently as by any private corporation, if not more cheaply.

Asks to Be Made a City.

White Plains, N. Y.—White Plains, with 20,000 inhabitants, hopes to become a city. James C. Farrell, representing the village governing board, has taken to Albany a charter which the legislature will be asked to enact, making White Plains a municipality. The village board have voted five to four to present the charter.

Denver Will Sell Water Plant Bonds Over Counter.

Denver, Colo.—If Denver builds or buys a municipal water plant, its citizens will hold most of the bonds themselves instead of selling them to eastern bankers, according to plans formulated. The Utilities Commission plans to issue the bonds in denominations of $10 and $25 and sell them over the counter, like merchandise, to the public. The bonds will pay 4½ per cent interest. The people have already authorized $8,000,000 in bonds to build a new water plant or buy the present one from the Denver Union Water Company.

Towns Refuse to Consolidate.

Gadsden, Ala.—Alabama City and Attalla will not be consolidated. At a meeting of the council of Alabama City a resolution has been defeated to appoint a commission to negotiate with a similar body from Attalla with a view to arranging for the amalgamation of the two towns.

Adopt Commission Government.

Osawatomie, Kan.—Commission government for Osawatomie has been carried by a majority of almost 5 to 1. A light vote was polled. Out of 353 votes cast, the new rule had a majority of 225, there being 289 votes for new form. Osawatomie will elect officers under the new rule at the regular municipal election in April.

San Antonio, Tex.—Commission government for San Antonio was the choice expressed by citizens of this city in an election held last week, the vote being about four to one in favor of the amended charter. The new form of government, with a provision for the initiative, referendum and recall, will not go into effect, however, until May, 1915, at which time the term of the present administration will expire. A vast number of amendments to San Antonio's charter were adopted. One of these eliminates the city poll tax of $1.

Defeat Commission Form of Government.

Rhinelander, Wis.—Complete returns from the special election on the question of changing to the commission form of government show 138 for and 524 against.

Green Bay, Wis.—A special election held in Green Bay to determine whether or not to reorganize the government of the city and adopt the commission government in place of the present aldermanic system has resulted in a vote of 1,395 for and 2,325 against. Commission government was rejected here two years ago by a vote of 2,132 to 1,917.

Will Vote on Commission Government.

Lodi, Cal.—The question of adopting a commission form of government for the city of Lodi will be voted upon at the coming election. The matter will be submitted by the trustees without comment and the voters will decide whether or not to adopt it.

Sustain Five Commissioner Plan.

Aberdeen, S. D.—Petition to have the present body of five commissioners removed and the three commissioner plan of government substituted, lost out here by 446 votes. All wards of the city have endorsed the present administration with large majorities.

Seek City Manager.

Lakeland, Fla.—It was decided at a meeting of the city commissioners to employ a city manager who shall have entire charge of the city's affairs. Lakeland has been under the commission form of government since January.

STREET CLEANING AND REFUSE DISPOSAL

Favor Law for Compulsory Snow Removal.

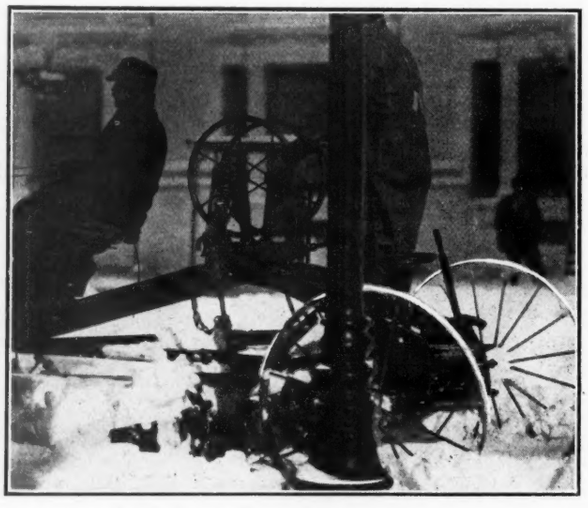
Washington, D. C.—A favorable report on the Dillingham bill for the removal of snow and ice in the District of Columbia has been ordered by the Senate Committee. The bill puts the burden of cleaning the sidewalks of snow and ice upon the owners, occupants or those in control of all private residences and lots privately owned within the fire limits of the District, abutting on paved sidewalks. The District Commissioners must clean the sidewalks of all buildings owned or occupied by the District Government, and in front of all public squares, reservations and open spaces owned or leased by the District.

Incinerator Saves Fuel Bills.

Duluth, Minn.—A combination garbage and fuel burner now in use at the county jail may demonstrate what a big saving can be made in fuel bills if garbage is disposed of in this manner. The incinerator at the county jail has been installed about a month. During the summer months when little, if any, fire is required from the main heating plant, the new device will be used to its best advantage. The patent incinerator is so arranged that all of the hot water needed for the use of the institution may be supplied from a tank attached to it.

Dayton Streets Rapidly Cleared of Snow.

Dayton, O.—The heaviest snow storm in three years has hit Dayton while the lowest temperature of the winter obtained—4 degrees below zero. Traffic was crippled so badly that only one-third of the farmers brought their commodities to the market. City officials were commended on the splendid showing they made in removing the snow.



Courtesy Dayton (O.) News.
SNOW PLOW IN OPERATION.

Wagons were on the job early, and many of the sidewalks were rapidly cleaned. The work of clearing the snow from the streets was greatly facilitated by the use of snow plows similar to that shown in the illustration, which presents, in operation, the "Little Winner," made by the Good Roads Machinery Company, Inc., of Kennett Square, Pa.

RAPID TRANSIT

Chicago Subways to Be Municipally Owned.

Chicago, Ill.—Complete municipal ownership of the initial subways from portal to portal, including river tunnels and tracks, will be provided for under the revised plans of the council committee on local transportation. The surface companies will not be asked to advance a penny toward the construction of the tubes, to permit the use of the Van Buren street and Washington street tunnels in the west side route, or to furnish the equipment for the bores. The first expense will be met with the city's traction fund, and a campaign will be begun for the passage of state legislation to open the way for financing extensions. This change was agreed upon when it was found that giving the traction companies any part in the title to the subways might endanger the "recapture" of the tubes by the city at the expiration of their franchises in 1927.

MISCELLANEOUS

Insure City Property Against Fire.

Baltimore, Md.—An ordinance creating a fund of $250,000 to be applied as an insurance fund for city property has just been signed by Mayor Preston, having passed both branches of the City Council. The fund is to begin with $10,000 in the ordinance of estimates for 1914, and each year a like sum will be appropriated until the total of $250,000 is reached. This total will then remain until depleted. All fire damage to city property will thus be covered.

Will Push War on Mosquitoes.

Atlantic City, N. J.—With the permanent organization of the county mosquito extermination commissions of the state under the name of the New Jersey Mosquito Extermination Association, it is believed that the movement to procure state appropriation for mosquito extermination purposes has been greatly accelerated. The presence of Governor Fielder's secretary at a recent session, and his assurance that the governor was ready to do what he could to help the association, was also an encouraging feature. That New Jersey's prosperity would be increased by the elimination of the mosquito was generally conceded. The sum of $100,000 has been mentioned as a desirable appropriation from the state treasury.

Municipal Phone System Upheld.

Mitchell, S. D.—Holding that the operation of a municipal telephone system in South Dakota was a public purpose, Judge R. B. Tripp, of Yankton, has dismissed the injunction suit to restrain the city of Mitchell from building a $60,000 plant voted at a special election last June. This is the first ruling on the legislative act of 1907, permitting cities to engage in the telephone business. The telephone company will carry the case to the Supreme Court.

Civil Service for City Employees.

Covington, Ky.—Every employee of the city of Covington, with the exception of the heads of departments, will be forced to undergo a civil service examination, according to an ordinance prepared by City Solicitor Fred W. Schmitz and presented to the Board of Commissioners. The power of civil service will be placed in the hands of a civil service commission consisting of three men, to be appointed, whose salaries will be $300 per year. Every policeman and fireman will be forced to undergo a civil service examination.

Sever Storm Strikes Atlantic States.

New York, N. Y.—One of the severest storms since the great blizzard of 1888 has not only isolated New York by paralyzing transportation and other facilities of communication, but has made its effects felt throughout the Atlantic states from Maine to Georgia. Newport, R. I., reported that property on the beaches was badly damaged by the tremendous seas; the seawall, constructed of stone, was broken down for a distance of 200 feet. With a gale blowing at the rate of 100 miles an hour, Nantucket, Mass., saw many of its farm buildings demolished and ships forced from their moorings. Heavy rains and floods in New Hampshire and Connecticut demoralized the transit and telegraphic service. New Jersey, New York and Pennsylvania towns were snowed in so badly that schools and factories had to be closed and all communication, save perhaps by telephone, was temporarily cut off.

LEGAL NEWS

A Summary and Notes of Recent Decisions—Rulings of Interest to Municipalities

Debt Limit—Michigan Cities.

Attorney General ex rel. Barbour et al. v. Lindsay et al.—The Verdier Act, relating to indebtedness of municipal corporations, gives the limit of 8 per cent of the assessed valuation for debts for general municipal purposes, but also gives the city the right to contract a debt of not over 2 per cent for the purpose of acquiring any or all public utilities, thus making the total bonded debt for which the city is liable in no case to exceed 10 per cent.—Supreme Court of Michigan, 145 N. W. R., 98.

Regulation of State Commission—Reasonableness.

Phoenix Ry. Co. of Arizona v. Geary et al.—An order of a state corporation commission requiring a street railroad company to double-track a portion of its line in a city of 25,000 population extending ten blocks and to connect with another portion in the business section already having a double track held not shown to be unreasonable, and a preliminary injunction to restrain its enforcement denied; but the company held entitled to the continuance of a temporary restraining order to prevent the enforcement of the extreme penalties imposed by statute for failure to obey the order until it should have a reasonable time to comply therewith.—United States District Court, 209 F. R., 694.

Eminent Domain—Adverse User.

Bigelow v. City of Springfield.—In an action against a city for the value of land which plaintiff alleged the city had taken for street purposes, an answer alleging that by a certain judgment and decree plaintiff was divested of his right, title, and interest to such land, and further alleging that for twenty years the traveling public had openly, notoriously, and adversely, used such land as a public highway exclusively and with plaintiff's acquiescence, did not admit that title was vested in the city.—Springfield Court of Appeals, Missouri, 126 S. W. R., 750.

Personal Injuries—Ditch.

Colorado City v. Hunt.—Plaintiff, who had lived in the vicinity for over two years, was familiar with the ditch in the alley leading to her home which she claimed caused her injuries. It appeared that she had been away for some time and on returning found that the ditch had been opened and was hurt in attempting to jump it. Held, that plaintiff was guilty of contributory negligence as a matter of law in attempting to jump the ditch and could not recover against the municipality for injuries received in her attempt.—Supreme Court of Colorado, 128 P. R., 24.

Change of Grade—Right to Damage.

Hunt v. Village of Otego.—Village law provides that no person shall be entitled to recover damages by reason of a street improvement, who shall in writing request that the grade of any such street shall be changed, but that the subdivision shall not apply to a change of the grade of streets, highways, or bridges by village authorities. Held, that a property owner, by marking his ballot "yes" at an election to determine whether a street should be improved, did not assent to the change of grade in a village which had exclusive control of the streets therein so as to preclude his recovering damages therefor.—New York Supreme Court, 145 N. Y. S., 494.

Authority to Employ Special Engineers.

Kimball v. City of Buffalo.—Laws 1911 provide that the Grade Crossing Commission of Buffalo "shall have power to employ engineers, an attorney and stenographer, and to fix their compensation." A section provides that the expense of the commission and the compensation of the engineers shall be paid by the city, and another section empowers the city to borrow money to pay its share of the expense in carrying out the plans of the commission and of paying the engineers employed. Held, that the commission can employ special engineers for temporary work in addition to its permanent corps of engineers, and a special engineer employed by the commission could recover from the city for his services.—New York Supreme Court, 145 N. Y. S., 529.

Injuries in Streets—Abandoned Automobile.

Huyler v. City of New York et al.—The failure of a city to remove a partially burned and abandoned automobile from the street within a period of three hours and a half after it had notice thereof was not negligence so as to make it liable for injuries from a collision with the automobile.—New York Supreme Court, 145 N. Y. S. 650.

Eminent Domain—Due Process of Law.

Evans et al. v. Mayor and Council of City of Crisfield.—Where, under a statute, owners of property taken in a street widening proceeding had an opportunity to appeal to the circuit court, and failed to do so, their property was not taken without due process of law, even though the damages assessed were inadequate.—Court of Appeals of Maryland, 89 A. R., 430.

Repairing Asphalt Pavements—Construction of Contract.

Uvalde Contracting Co. v. City of New York.—Where the contract for the repair of pavements required that the amounts should be ascertained from the records of the engineer, the certificate of the engineer as to the amount of work is conclusive upon the contractor, except for bad faith and mistake, or where the engineer has attempted to interpret the contract, and has erred in interpretation based upon the law applicable thereto. Where a contract for the repair of pavement provided that the repairs should be indicated by chalk marks made by the inspectors, and any imperfect work should be rejected, the contractor is entitled to payment for overlaps in patches caused by the failure of the inspectors to mark the place for patches as large in the first instance as they should have been made, and necessitating the removal of the patch and the laying of a larger patch.—New York Supreme Court, 145 N. Y. S., 604.

Raising Money for Extraordinary Purposes.

Lyon v. City of Binghamton et al.—Since, as charter of the city of Binghamton, a special law, authorizing the Common Council to declare that the necessity exists for the expenditure of a greater amount of money for some extraordinary purpose than shall have been raised in the ordinary tax budget, and then submit the proposition to a vote, etc., does not conflict with General Municipal Law, a general law applying to all municipalities unless obstructed by some special law, providing that no funded debt shall be contracted by a municipality except for a specific object, expressly stated in the ordinance, etc., and that such ordinance shall provide for raising annually, by tax, a sum sufficient to pay the principal and interest, the general law is applicable to the city of Binghamton, an ordinance of the city, providing for the issuance of bonds for the erection of a municipal lighting plant, which failed to provide for a tax for the payment of principal and interest, was, under the general law, void, since it was an attempt to create a funded debt.—New York Supreme Court, 145 N. Y. S., 424.

Sewer Contract—Foundations—Extra Work.

Merrill-Ruckgaber Co. v. City of New York.—A contract for the construction of sewers provided that in the construction of sewers and appurtenances, "where found necessary," concrete with the necessary foundation timber should be furnished and placed by the contractor, as required by the engineer, and paid for at the price bid. The schedule of prices provided "for concrete in place per cubic yard, the sum of ten dollars. * * * For additional excavation per cubic yard the sum of $1.50." The clause providing for concrete foundations also provides that such foundations shall be paid for at the price bid, and not, as is provided in other provisions, that the cost shall be included in the price bid for the completed sewer. A special bid was asked for concrete in place. Held, that the cost of concrete foundations ordered to be put in was not included in the price bid per linear foot for the completed sewer. If the city engineer erroneously decided that the cost of concrete foundations, where ordered in sewer work, was included in the price bid per lineal foot for the completed sewer, when it was not included therein, the contractor could recover the value of such foundations, notwithstanding the issuance of a final certificate on the basis of the engineer's erroneous decision.—New York Supreme Court, 145 N. Y. S., 577.

NEWS OF THE SOCIETIES

Calendar of Meetings.

March 9-11.
ILLINOIS WATER-SUPPLY ASSOCIATION.—Annual Meeting, Urbana, Ill. Edward Bartow, secretary, Urbana.

March 12.
VERMONT SOCIETY OF ENGINEERS.—Annual Meeting, Burlington, Vt. George Reed, secretary, Barre.

MARCH 16-17.
ARKANSAS ENGINEERING SOCIETY.—Third Annual Meeting, Pine Bluff. P. B. Hill, secretary, Little Rock.

April 4-11.
EFFICIENCY SOCIETY, INC.—First National Efficiency Exposition and Congress, Grand Central Palace, New York City. W. H. Tallis, exposition director, 41 Park Row, New York City.

April 16-17.
TRI-STATE WATER AND LIGHT ASSOCIATION.—Annual Convention, Atlanta, Ga. F. C. Wyse, assistant secretary, Columbia, S. C.

April 23-24.
VIRGINIA PUBLIC HEALTH ASSOCIATION.—Annual meeting, University of Virginia, Charlottesville. Dr. M. G. Perrow, Lynchburg, Va., president.

May 11-15.
AMERICAN WATER WORKS ASSOCIATION.—Thirty-fourth Annual Meeting, Philadelphia, Pa. J. M. Diven, secretary, 47 State street, Troy, N. Y.

October 20-23.
INTERNATIONAL ASSOCIATION OF FIRE ENGINEERS.—Annual Convention, New Orleans, La. James J. McFalls, Secretary. Roanoke, Va.

Municipal Engineers of the City of New York

For Saturday, February 28, 2 p. m., an excursion has been arranged to inspect the new asphalt paving repair plant of the Borough of Manhattan located on the block bounded by 90th street, Avenue A, 91st street and the East River.

Virginia Road Builders' Association.

The third annual convention was held at Murphy's Hotel, Richmond, Va., February 11-12. The convention opened with President C. B. Scott in the chair. About 200 members were in attendance. Mayor George Ainslie made the welcoming address. State Highway Commissioner spoke on "Road Improvements in Virginia," dealing for the most part with maintenance problems. A patrol system made up of former convicts to be employed by the State was advocated. Dr. Joseph Hyde Pratt, spoke on "Road Building in North Carolina." Harry F. Boyd, president of the Valley Turnpike Company, told of the work of his company and the proposed improvements. Among the other papers presented were the following: "Road Building in Southwest Virginia," John W. Chalkley, president Wise County Good Roads Association; "Effect of Road Work on Health of Prisoners," Dr. R. C. Whitehead, physician and surgeon, Norfolk; "Road Improvement in Russell County," E. S. Finney, attorney at law, Lebanon, Va.; "Maintenance of Earth Roads," B. W. Hubbard, farmer and fruit grower of Bedford County; "Sand Clay and Soil Roads," F. D. Henley, assistant engineer, Virginia State Highway Commissioner.

Canadian and International Good Roads Congress.

The first congress under the auspices of the Canadian Highway Association and the Canadian Automobile Federation, and with the further cooperation of the American Highway Association, will be in the Arena, Montreal, May 18 to 23. Appropriate papers dealing with the various phases of road work will be read and discussed. The official opening of the King Edward Highway, 45 miles long, connecting Montreal with the New York State roads, will take place. An exhibition has been arranged at the suggestion of several large manufacturers. An association of manufacturers will be formed for the purpose of developing the business interest of its members. The first allotment of space will take place February 25. George A. McNamee, New Birk building, Montreal, the general secretary, is also manager of the exhibition. W. H. Dandurand is chairman and Horace Joseph, vice chairman of the congress.

Good Roads Institute, North Carolina.

There will be held under the auspices of the Highway Department of the University of North Carolina and the North Carolina Geological and Economic Survey at the University of North Carolina, Chapel Hill, on March 17tlh, 18th and 19th, a Good Roads Institute conducted especially for road engineers and superintendents. Anyone, however, who is interested in road construction is cordially invited to attend to lectures.

A series of lectures are to be given by men well trained in their lines covering subjects relating to road construction. Following the lectures there will be an opportunity for an open discussion on the subjects.

First Day—March 17th

Consideration governing the proper location of roads.

Methods of making road surveys.

Use of the Adney Level in road location.

The design of roads, (including width, curve, depth of ditches, etc.)

Illustrated lecture on asphalt from its source to the pavement.

Second Day—March 18th.

Sand-clay, top soil, and gravel roads.

Macadam roads.

Bituminous macadam roads.

Relative merits and defects of various surfaced roads, as bituminous macadam, macadam, concrete, brick, etc.

Drainage of roads.

Bridges and culverts.

Illustrated lecture on explosives.

Third Day—March 19th.

Road machinery.

Road surfacing materials in North Carolina.

Dirt roads.

Maintenance of roads.

Organization of road forces.

Road contractor.

Among those who will deliver lectures are: M. A. Stacy, acting dean of the University; T. F. Hickerson, professor of highway engineering in the University; Collier Cobb, professor of geology in the University of North Carolina; Joseph Hyde Pratt, State Geologist; D. Tucker Brown, field organizer and engineer for the North Carolina Good Roads Association; W. S. Failis, road engineer; R. T. Brown, road engineer of Orange County and N. C. Hughes. Jr., road engineer of Halifax County and others.

All the boards of county commissioners and road commissioners are urged to authorize their road engineers and superintendent to attend the institute.

Maine Society of Civil Engineers.

The civil engineers of the state held a two-days' convention in Waterville. The first day was taken up with the annual business meeting in the afternoon and the banquet in the evening, at The Elmwood. In the afternoon at the meeting the regular routine business was carried out and the following officers were elected: President, A. E. Greenwood; vice-president, Charles A. Mixer; secretary and treasurer, F. G. Pressey; board of directors, Seth A. Moulton, H. E. Green, G. C. Jordan, I. B. Sargent, J. C. Stevens. In the evening a fine banquet was enjoyed and a number of speeches by the officers and members. The feature of the convention was a paper by Prof. C. B. Brown on "Railway vs. Waterway for Transportation." The second day of the convention, Thursday, was passed in visiting the Hollingsworth & Whitney and the Lockwood plants.

Arkansas Engineering Society.

The third annual meeting will be held at Pine Bluff, March 16-17. A partial list of the speakers and their subjects follows: "Facts Concerning Fourche District," by A. M. Lund, of Little Rock; ''Wood Block Pavements," D. A. McCrea of Little Rock; "Floor Protection," Charles H. Miller, Little Rock; "Vertical Fiber Brick Pavements," L. R. Parmalee, city engineer of Helena; "Waterworks," W. D. Dickinson, of Little Rock; "Sewage Disposals," Theo Hartman, of Little Rock; "Dirt Roads," E. A. Kingsley, Little Rock, former state highway engineer; "Bituminous Protected Concrete for Country Highways," J. T. Watson, Pine Bluff; "The Advancement in Engineering Education," Prof. J. J. Knoch, dean of the engineering department of the University of Arkansas; "Aims and Objects of the State Highway Commission," H. R. Connor, state highway engineer, Little Rock.

The officers of the society are W. J. Parkes, Pine Bluff, president; D. A. McCrea, Little Rock, vice president; P. B. Hill, Little Rock, secretary and treasurer.

City Engineer Frank R. Allen, of Pine Bluff, is chairman of the entertainment and program committee.

International Association of Fire Engineers.

The directors committee met at New Orleans, February 24, to make arrangements for the annual convention to be held at New Orleans, October 20-23. The committee prepared a tentative program for the sessions including papers to be read and discussions to be indulged in as well as the program for the tests of the various kinds of apparatus that will be displayed.

The program of the topics to be discussed is as follows:

First—Practical first aid to the injured.

Second—Automobile fire stations.

Third—Organization and equipment of volunteer departments.

Fourth—Fire prevention and the best way to prevent fires.

Fifth—The best method to be used by a chief who is also superintendent of the fire alarm.

Sixth—Automatic sprinklers, their effciency and advantage.

Seventh—The protection of water fronts, the necessity and efficiency of fireboats.

Eighth—Has the gasoline pumping engine come to stay, and why?

One of the most important events of the meeting was the presence of George W. Booth, chief engineer of the National Board of Underwriters, of New York, who advised and consulted with the directors and with Chief Boyd, chairman of the exhibit committee, in laying out the line of tests for pumping engines that will be exhibited during the convention. They decided to abrogate the old rule of making the tests for twelve hours, and made it that the pumping tests of engines shall be not to exceed four hours.

Tennessee Conference on Roads.

A four-day conference on road building was held at the University of Tennessee, Nashville, February 24-27, and steps were taken to hold similar annual meetings in the future. The visitors were welcomed by Dr. Brown Ayeres, president of the university. Among the papers presented and addresses made were the following: Construction of Sand Clay Roads, by Dr. Hewes, Office of Public Roads; Gravel on Water Bound Macadam Roads, by Dr. Hewes. Construction and Maintenance of Bituminous Surfaces and Bituminous Pavement, by Prof. A. H. Blanchard, Columbia University. Modern Road Making Machinery, by Mr. Beatty, Chicago. Modern Developments in Highway Engineering in Europe, by Prof. A. H. Blanchard. Road Laws of Tennessee, Judge H. H. Ingersoll, University of Tennessee. Highway Economics, Dr. Hewes. Discussion led by J. A. Reagan, Sweetwater. Economic Value of Good Roads, M. V. Richards, land and industrial agent, Southern Railway. Discussion led by H. D. Tate, State agent, Farmers' Co-operative Demonstration Work, Nashville. Highway Maintenance, Dr. Hewes; discussion, William Park, civil engineer, Knoxville. Use of Petroleum By-products in Road Making, G. F. Steele, Nashville. Concrete Roads, W. A. McIntire, Philadelphia. False Ideas of Road Construction, W. S. Keller, state highway engineer, Alabama; discussion led by J. Wylie Brownlee, contractor, president Board of Commerce, Knoxville. Rock Available for Road Building, A. H. Purdue, state geologist, Tennessee; discussion led by Dr. C. H. Gordon, assistant state geologist. State Control Highway Improvement, W. S. Keller. Discussion. Selecting the Route, by Prof. C. A. Keffer, University of Tennessee. Dirt Roads, Dr. J. H. Pratt, state geologist, North Carolina. Grades for Country Roads, Prof. W. W. Carson, University of Tennessee. Proposed Highway Legislation for Tennessee, Cyrus Kehr, secretary State Highway Association. Discussion, led by A. N. Fisher, president, State Highway Association of Tennessee. Sand Clay Roads, Dr. J. H. Pratt. Use of Refined Tar in Building and Maintaining Roads, Mr. Sharples, Boston.

The conference voted its approval of the platform of the Tennessee Highway Association, the principal feature of which advocates the formation of a non-political state highway department. Other points are the issue of state highway bonds, use of convicts for construction and a number of changes in the state laws providing for acquiring right of way, etc.

Virginia Public Health Association.

Lynchburg, Va., Feb. 15.—For the first time in its history the Association will meet separately from the Virginia State Medical Society. Dr. Mosby G. Perrow, health officer of Lynchburg and president of the Virginia Public Health Association, has announced that the next meeting of the association will be held April 23-24, at the University of Virginia, Charlottesville.

Among the speakers will be Dr. Harvey W. Wiley, Dr. Carl L. Alsberg, chief of the bureau of chemistry; Dr. L. O. Howard, chief of the bureau of entomology; Dr. William C. Woodward, president of the American Public Health Association; Dr. J. W. H. Pollard of Washington and Lee University, Dr. Stephen H. Watts of the University of Virginia and a number of others.

Ohio Engineering Society.

At the thirty-fifth annual meeting, Columbus, February 14, the following officers were elected: Frank M. Kennedy, Washington, C. H., president; Wm. F. Sheflin, of Fremont, vice-president; John Laylin, Norwalk, secretary-treasurer. The trustees elected were: C. L. Bush, Mansfield; A. F. Cole, Marietta; F. J. Cellarious, Dayton; F. W. Jennings, C. T. Sherman, of Columbus.

New England Water Works Association.

The following papers will be presented at the March meeting, Boston, March 11:

"Some Problems Connected With the Design of Small Water Works Systems," Ills, by William S. Johnson, Sanitary and Hydraulic Engineer, Boston, Mass.

"A Study of Rates of the Private Water Companies in Connecticut," Ills., by Joseph N. McKernan, Engineer and Superintendent, Plainville Water Company, Plainville, Conn.

Report of Committee "To Prepare a Standard Specification for Fire Hydrants." H. O. Lacount, chairman.

Iowa Engineering Society.

At the twenty-sixth annual meeting Council Bluffs, February 20, the following officers were elected: president, W. G. Raymond, Iowa City; vice-president, William H. Kimball, Davenport; secretary-treasurer, S. M. Woodward, Iowa City; directors, M. G. Hall, Centerville, and J. B. Davidson, Ames.

PERSONALS

Anderson, Benton R., Epworth, Ia., has been appointed City Engineer of Carroll, Ia.

Carter, H. R., Little Rock, Ark., has been appointed State Highway Engineer.

Collins, Thomas E., New Brunswick, N. J., has been reelected City Engineer.

Dater, Philip H., Portland, Ore., has been appointed City Engineer.

Davis, Grant, has been appointed County Engineer of Hunterdon County, N. J.

Donoghue, G. T., Chicago, Ill., has been appointed Chief Engineer, Lincoln Park Commission.

Gellatley, William, has been elected president of The Gamewell Fire Alarm Telegraph Company, succeeding the late W. H. Woolverton. Mr. Gellatley was elected by the unanimous vote of the board of directors. He has been an officer of the company for twelve years, and during the past four years has served as vice-president and general manager. His promotion is a tribute to the ability and success of his management of the affairs of the company.

Patterson, E. B., Dallas, Tex., has been appointed Resident Engineer of the park system.

Phelps, H. E., city engineer, Boulder, Col., has resigned. Mr. Phelps has been appointed assistant professor of civil engineering, University of Colorado.

Seidl, Hans E., and W. E. Housman, Swetland Building, Cleveland, O., have joined the firm of Seidl & Housman, consulting engineers, specializing in public utility work.

St. John, W. G., Atlanta, Ga., has been reelected secretary of the Water Works Department.

Rundlett, L. W., Commissioner of Public Works, Moose Jaw, Canada, has resigned.

Vogel, John L., Jr., has been appointed assistant engineer of the Public Utility Commission of New Jersey.

Williams, William, has been appointed Commissioner of the Department of Water Supply, Gas and Electricity, New York City, succeeding Henry S. Thompson.

NEW APPLIANCES

ELASTITE.

Carey's New Paving Joint Has Thick Filler of Asphalt Between Two Layers of Felt.

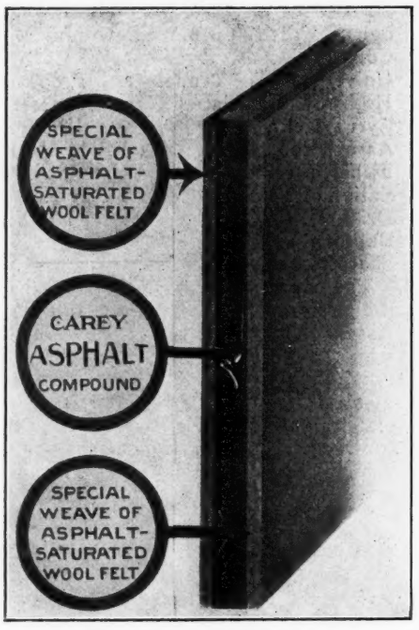
The Philip Carey Company, Cincinnati, O., have placed on the market a new material, the Carey Elastite Paving Joint No. 2, which has been aptly called the "Sandwich Joint" on account of the nature of its construction, which is clearly shown in the illustration. It consists of a heavy body of asphalt compound of the same quality as that used in the original Elastite joint placed between two layers of a special grade of asphalt saturated wool felt, the whole being firmly bonded. The advantage claimed in this joint is increased compressibility, secured by increasing the volume of the asphalt compound and keeping it in a solid body instead of distributing it in several layers. Tests made show that when placed in a pavement comparatively little asphalt is forced out, due to even distribution of the compound from top to bottom and end to end of the joint and its uniform thickness.

Fred C. Smith, city engineer, Sioux City, Ia., in response to a recent letter from the Municipal Journal, inquiring about the joint, replied as follows:

In reply to your letter of February 10, 1914, regarding Elastite, will say, that Sioux City is using Carey Elastite No. 2, which is composed of a quarter inch of asphalt between two layers of saturated wool felt. We have in all twenty-one miles of concrete pavement, with joints, longitudinally, on both edges, and transversely, every twenty-five feet.

The first thirteen miles were laid with joints poured with asphalt, that are still in fairly good condition, and with some repairs will be all right. The last eight miles were laid with the elastite joint, and are today in perfect condition. The pavement laid here is all one-course, and six inches thick.

The elastite is furnished us in strips,

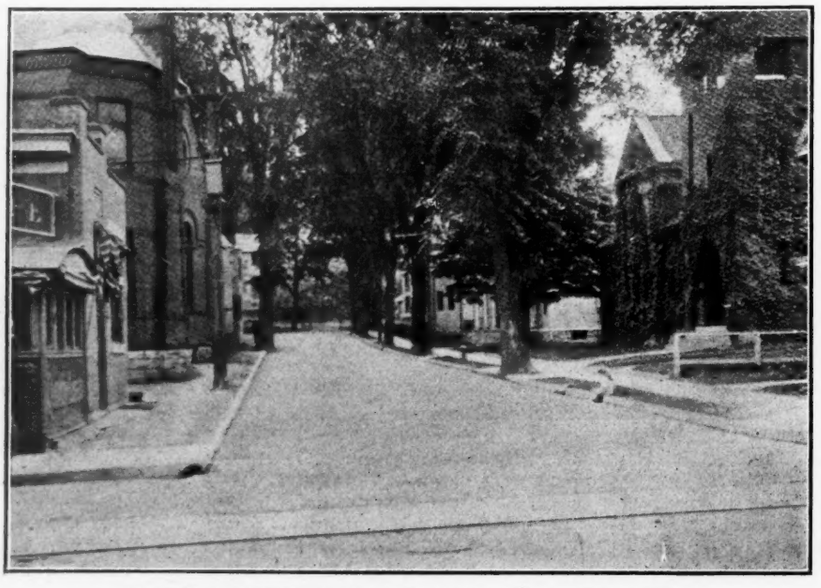


SANDWICH JOINT.

one-half inch by seven inches, by five feet; these strips are staked to line and grade, and the concrete is placed, and floated, on both sides of the strip, leaving them from one-half to one inch above the finished pavement. After the concrete has set, the strips are trimmed with a sharp shovel, and left flush with the pavement. The joints thus made are not noticeable in driving over them, and show only as a half inch black line on the concrete. There is no chance for the traffic to wear the concrete at the joints, and they show no signs of wear on our pavements.

During extremely hot weather, the expansion of the concrete causes the quarter inch of asphalt to squeeze out about a quarter inch, and this is ironed out by the traffic. In the colder weather this asphalt is either worn away, or hammered back into the joint, leaving no trace on the pavement. Where good material is used, and concrete properly placed, finished and cured, there are no weak places in the pavement, except at the Joints, and Carey's Elastite has cured this weakness for us, and enabled this City to do a large amount of street improvement with a low priced pavement.

We will lay about fifteen miles of concrete pavement during the coming year (1914), and have specified Carey's Elastite for all joints. I know of no stronger endorsement than this for paving joint material.



CEMENT PAVEMENT PRESERVED BY IDEAL JOINT.

IDEAL EXPANSION JOINT.

A Premoulded Strip of Asphalt Made in Various Widths and Thicknesses.

Waring-Underwood Company, 620 Commercial Trust Building, Philadelphia, Pa., manufacture an all asphalt expansion joint mainly used to take care of the expansion in brick, wood block, granite block, concrete pavements, foundations and sidewalks. It has already been used in more than thirty cities. The strips are made in seven foot lengths of any desired width from ¼ inch to 1½ inch. Standard thicknesses (vertical measurement) are 3, 3½, 4, 5, 6 and 7 inches. Ideal Expansion Joints are shipped in boxes containing about 250 pounds of material. This is a convenience in construction inasmuch as the original packages can be distributed along the work with other materials exactly as it will be required. The high grade asphalt used insure the greatest possible stability, so far as temperatures are concerned, and resistance to action of water and street liquids.

The saving to the contractor are summarized by the manufacturer as follows:

Cost of wood strips.

Labor of placing and removing wood strips.

All difficulties in removing wood strips.

Labor to heat material and pour the joints.

Delays in paving work occasioned by pouring expansion joints.

Transportation and using heating and pouring equipment.

Investment in and depreciation of heating and pouring equipment.

Handling raw material and all waste in handling same.

Cost of excess material which runs between blocks when joint is poured previous to grouting.

J-M EXPANSION JOINT.

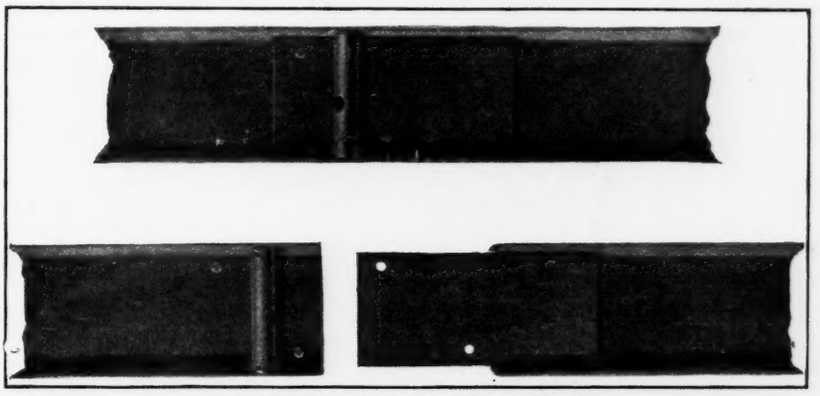
Strips Made of Asbestos Felt and Asphalt.

The H. W. Johns-Mansville Co., Madison avenue and 41st street, New York, have placed on the market the J. M. Everlasting Joint Strip for the purpose of taking up the expansion of block or cement pavement. The material is composed of four thicknesses of asbestos felt densely impregnated with and cemented together by pure Trinidad Lake Asphalt. Unlike wool, cotton and jute fibres, the asbestos will not rot or disintegrate. The asphalt has a high melting point and it is claimed will not ooze in summer or become brittle in winter. Furthermore, it retains its waterproofing qualities indefinitely. The asbestos is, of course, indestructible.

J-M Expansion Joint Strips are made 1/10 inch thick and 32 inches long, in varying widths. They should be applied in three thicknesses between every 20 courses of brick, from curb to curb, and in two thicknesses between the curb and the brick. Strips should be placed so that joints are staggered. Three thicknesses will be found ample for most purposes. If the engineer wishes a thicker joint he may provide for any number of strips desired.

STEEL SIDE FORMS.

The R. D. Baker Company, Detroit, Mich., specialists in a number of appliances used in connection with the construction of concrete pavements, have placed on the market a new side form, shown in the illustration. The invention is designed not only to save expense but to aid in securing a high quality of workmanship. Recently, attention has been called to the possibilities of injury to the work as a consequence of mortar running out at the joints or around the side forms. The necessity of using tight forms together with the expense practically eliminates the use of wooden side strips. The Baker Indestructible Steel Side Forms are easily set up and are tight enough to hold the mortar in. The forms are strong and durable, and, it is claimed, even if roughly handled will remain in perfect condition. This enables the contractor to sell them for a good price at the end of a job in case he has no further use for them. The saving in labor is brought about by the ingenious jointing device, shown in the cuts, which enables the contractor to connect or separate the sections instantly. There is said to be absolutely no chance of binding or jamming. There are no nails to drive, and they are easily adjusted to grade. They form a true and substantial track on which the striking board moves. It is said that the first cost of the forms is no greater than one year's loss on wooden forms.



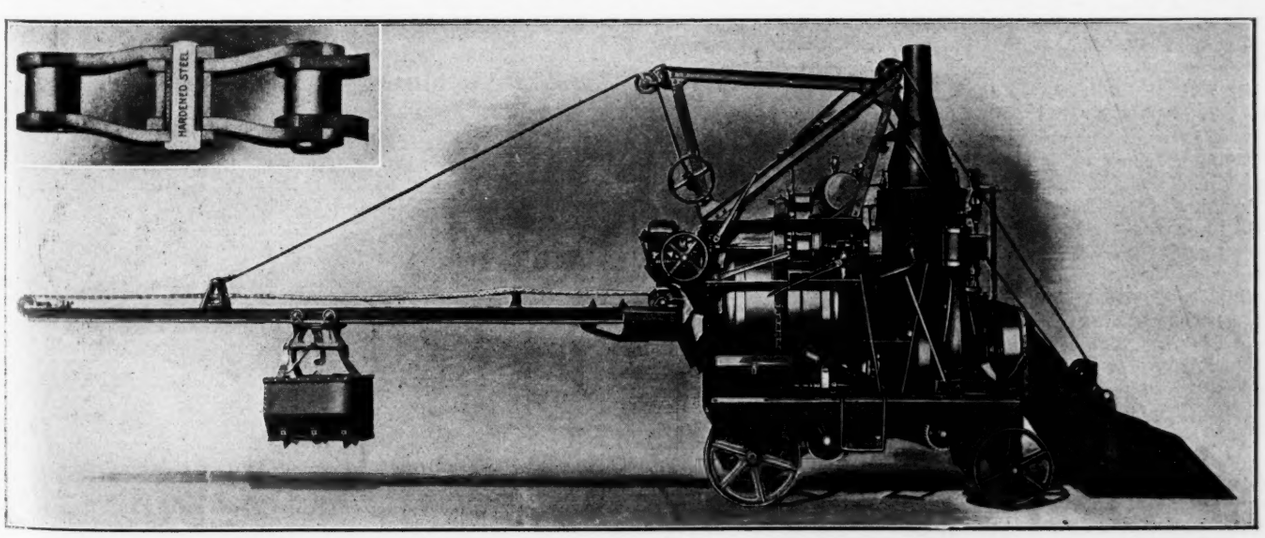
BAKER'S NEW STEEL SIDE FORMS.

CHAIN BELT PAVER.

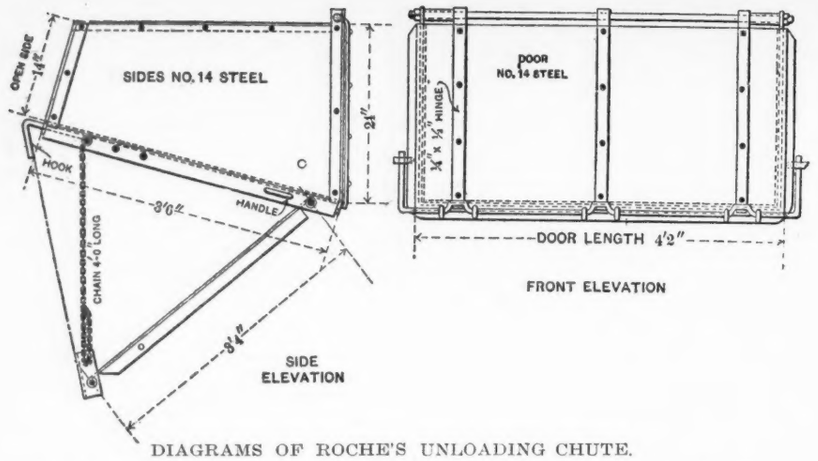
Delivery Bucket Operated by Chain Belt in 1914 Model—Levers Controlled by One Man.

The Chain Belt Paver, a modification of the Standard Chain Belt concrete mixer adapted for economical construction of street pavements and foundations was placed on the market last year. The standard mixer used for general purposes delivered concrete on the side, from a cast semi-steel drum driven by a chain belt passing over a large gear around the middle of the drum. In the paving model, the drum delivered forward. A discharge boom and bucket or a chute was provided for delivering the concrete on the street. The bucket was operated on the boom by a cable, in the 1914 model a Cabelco steel roller chain has been substituted so that now all the drives are steel roller chain belt. The bucket travels on the boom at the rate of 150 feet per minute, with a sure and positive movement. Another important feature of the machine is that the control levers are all on one side of the machine where one man standing on the platform can operate them all. It may also be noted that the levers are so arranged that they operate in a natural sequence. Another good feature is that the driver for propelling the paver and revolving the drum is split so that when the paver is moving along on its own power the drum does not revolve. It is said that the machine can climb a ten per cent. grade. A brake prevents the machine from slipping down hill.

A few of the general features of the



CHAIN BELT PAVER WITH NEW CHAIN DRIVEN DISTRIBUTING BUCKET.



DIAGRAMS OF ROCHE'S UNLOADING CHUTE.

machine are worth reviewing. The pavers are made in ⅛ and ½-yard sizes, mixed concrete. The power loader is of the open type—48 inches wide in the large machine. The delivery angle is 55 degrees. The delivery boom can be swung over an angle of 180 degrees. The standard boom is a double channel, 20 feet long. The bucket is of the center dump type, delivering outward. Cabelco is an all-steel chain belt with pins and bushings case-hardened and tested for hardness by means of a scleroscope. The drum rollers turn loose on the shaft and have phosphor bronze bushings.

ROCHE'S UNLOADING CHUTE.

Saves Idle Time of Both Men and Teams.

Perhaps the most exasperating losses to which a contractor is ever subjected are those involved in the unloading of cars. A contractor may figure his cost data accurately—one man can shovel, say twelve cubic yards of stone a day, a team can travel twenty miles, and the job is two miles away. These figures are true beyond dispute. The number of men and teams required and the cost of handling 100 cubic yards per day is easily figured. However, at the end of a payroll period the cost of handling the stone is often 25 to 50 per cent. above the theoretical cost. Where is the loss? In idle time of men and teams, of course. It cannot be anything else. The contractor spends more of his time looking into the cause of the trouble. He finds that the teams get bunched and the men cannot load them as fast as they come in. Again, the men are idle. The railroad's drill engines, move the cars, and both men and teams are idle or a freight train stands on a crossing longer than the law allows. If he looks into the matter more minutely he will find that each laborer digs a place for himself to work in to advantage, getting down to the floor of the car as soon as he can. After that he has an easy time. But he cannot dig down to the bottom of the car unless he has a place to put the stone.

All of these troubles are wonderfully relieved and the cost figures in the payroll agree with the cost data of the contractor's estimate when he uses an unloading chute, such as that shown in the illustration. Thomas M. Roche, 829 Monadnock Block, Chicago, Ill., is the sales agent for the unloading chute. It is a simple device as shown in the illustration. It is a steel box, attached to the side of a car, either a gondola or a box car, by braces easily put up. It is open on the end towards the shoveler, the sides are high enough so that he can easily see where to throw the material. On the end furthest from the car is an end gate, the full width and height of the chute. Chutes are made in ¾-yard, 1-yard and 1½-yard sizes. Two or three chutes full can be dumped into the wagon, or automobile, if it happens to be convenient to do so. The chute is made of sheet steel and angle iron, and is hooked up to the top of the car with two large hooks, which may be attached to the bottom frame of the chute at three points, according to the size of truck to be loaded. Two men easily handle a chute. By carrying it to the car in the wagon and setting it down with the hooks up and taking a short lift the hooks may be placed over the top of the car; then adjusting the braces makes it ready to be filled. When a car is empty the chute may be transferred to a loaded car by placing it on the last wagon load and letting the team draw it along to the next car.

L. E. Barne, township trustee, Hobart, Ind., says that chutes save 50 per cent. of the cost of handling material, and M. Yeager & Son, contractors, Danville, Ill., say the same regarding handling of sand stone, etc., on the work in their home city.

SMITH MASCOT MIXER.

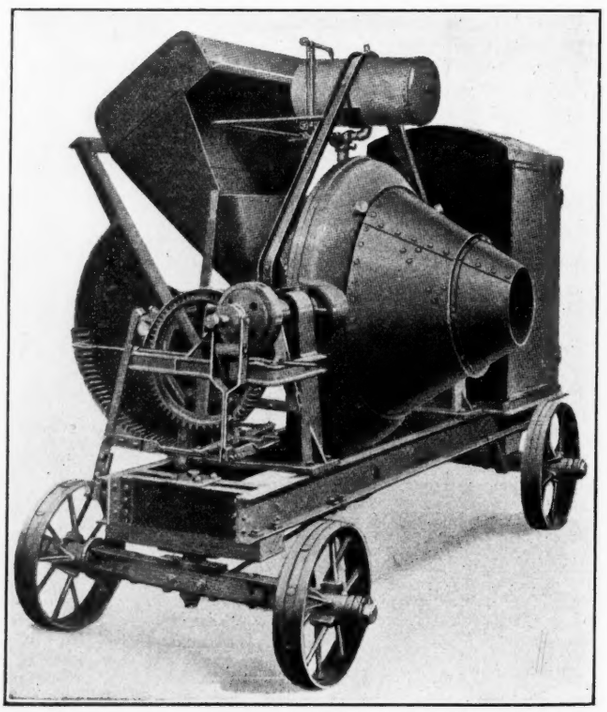
Small Duo-cone Machine with Power Loader.

The T. L. Smith Company, Milwaukee, Wis., have placed on the market a small sized concrete mixer of the duo-cone type which is as complete in every respect as a large machine. The capacity of the machine is four cubic feet of mixed concrete, which makes it suitable for building concrete sidewalks, curbing, culverts, etc. This mixer has been given the trade name Mascot. In discharging, the Mascot tilts giving a rapid discharge same as the large size cone mixers. The machine complete with trucks, gasoline engine and loading attachment weighs 3,675 pounds.

A valuable feature of the Mascot is a dust proof casing which protects the main gear and driving pinion from dirt. The lubricant on the bearings is constantly squeezed out by the weight of the drum and dirt cannot enter against the outward flow of grease.

The loading attachment is geared and operates without ropes or sheaves. The loading device weighs 650 pounds. It adds a comparatively small sum to the cost of the mixer. It is particularly useful on a portable machine where a low feed level is important. Instead of wheeling up a platform or shoveling into a high spout a man pulls the lever and lets the engine do the work. Practically the loader doubles the output of the mixer.

The T. L. Smith Company has made about 7,000 mixers in the United States and 3,000 in foreign countries. This all from a beginning thirteen years ago. The latest member of the Smith family embodies the experience thus gained.

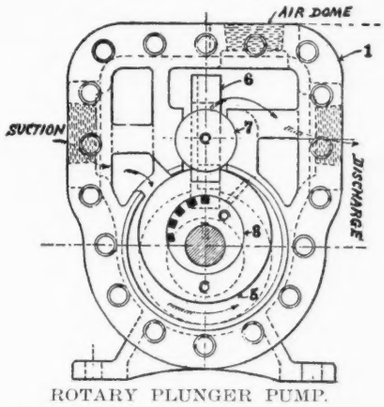


FOUR-FOOT SMITH MIXER.

KINNEY DISTRIBUTOR.

Motor Truck for Distributing Hot or Cold Bitumens Has Rotating Plunger Pump

The Kinney Manufacturing Company 100 Boylston street, Boston, Mass., have been manufacturers of pumps and nozzles for distributing oils, tars and asphalts for a number of years and have furnished these devices to the Massachusetts Highway Department, the Pennsylvania State Highway Department, the Barrett Manufacturing Company, the Studebaker Corporation and others. The pumps and the



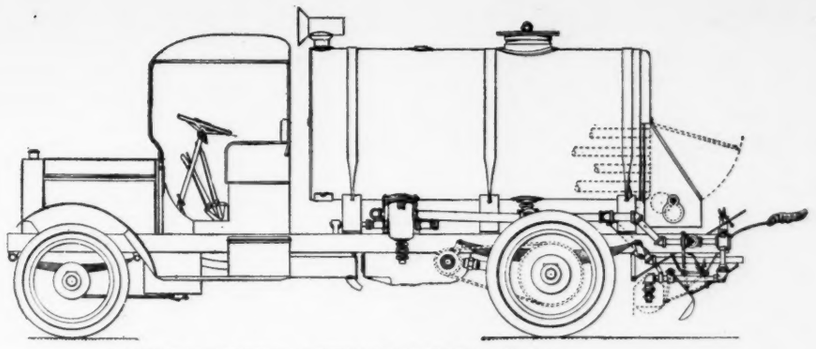
ROTARY PLUNGER PUMP.

nozzles have been used on horse-drawn vehicles and a number of motor trucks.

This year the Kinney Company are placing on the market a complete motor driven distributing equipment to handle bitumens of any grade. The chassis and motor will be a regular Kelly-Springfield truck of either 3½ or 5 tons capacity according to the size of tank to be carried. Specially heavy springs will be made and some special bracing to suit the peculiar nature of the load. The machine will be made in four sizes, the tanks holding 600, 800, 1000 and 1200 gallons respectively. The pump is driven by the automobile motor through a countershaft. Flues run through the tank, through which hot air from an oil burner in the rear flows. The heat is sufficient to melt a tank of cold asphalt but is designed principally to maintain temperatures on long hauls. There is a relief pipe leading from the pump to the tank. The spray can be started or cut off instantly. The nozzles are of several varieties adapted to the kind of material to be handled. The machine can be easily converted into a motor flushing or sprinkling machine.

The interesting feature of the apparatus, mechanically, is the Kinney rotating plunger pump, a diagram of which is shown. The action is as positive as that of a piston pump.

By referring to the drawing it will be seen that the Kinney Rotary Pump consists of a cylinder casting (1) which contains the suction and discharge chambers and the pump cylinders. This casting is accurately machined on both ends and the heads (2) are bolted to it by the studs and nuts (11). These heads carry the bearings (3) in which the shaft (9) rotates. These bearings


KINNEY MOTOR ASPHALT DISTRIBUTOR.

(3) also constitute the glands for setting up the packing which is accomplished by tightening the nuts (4).

The eccentric cams (8) are keyed to the shaft (9) and rotate with it inside of the cylindrical pistons (5) which are held from rotating by the slide (6) which works through the slide pin (7). This imparts a rotary oscillating motion to the piston, the liquid being drawn in through the open suction port and forced out through the opening in the slide (6) and into the top of the pump above the slide pin (7).

INDUSTRIAL NEWS

Cast Iron Pipe.—Chicago. Demand seems to be about normal. Prices are firm. Quotations: 4-inch, $27; 6 to 12-inch, $25; 16-inch and up, $24. Birmingham. Manufacturers admit that prices and orders are satisfactory. Quotations: 4-inch, $22; 6-inch and up, $20. New York. Private demand is quiet. Quotations: 6-inch, car loads, $22 to $23.

Lead.—Market is dull and unchanged. Quotations: New York, 4c.; St. Louis, 3.875c.

Controlling Product of Crusher

The impact or hammer type of crusher made by the Gardner Crusher Company, 1482 Broadway, New York City, can be used so as to control the mesh composition of the product to a degree that perhaps is not generally appreciated. This is an important fact for paving men to know as it makes it possible to supply at a moderate cost any sized aggregate that may be desired for the aggregate of bituminous concrete pavements. The machine is also valuable for crushing of old pavement mixture so that it can easily be reheated and mixed easily and used again on the street.

The following is a record of tests undertaken to crush 2½ inch trap rock to ¼ inch size with as low a percentage of fines as possible:

Screens	Speed	4 Mesh	8 Mesh	20 Mesh
⅜ in.	920 R. P. M.	98%	77%	41%
⅜ in.	810 R. P. M.	97½	71%	40%
⅜ in.	730 R. P. M.	98%	74%	40%
½ in.	730 R. P. M.	83%	56%	35%
½ in.	810 R. P. M.	89%	57%	31%
½ in.	904 R. P. M.	94%	69%	40%
½x1 in.	920 R. P. M.	76%	50%	31%
½x1 in.	1000 R. P. M.	83%	58%	37%

Note—The ⅜ in. screens give the greatest amount of product between 4 and 20 mesh, and although the ⅜ in. product carries more "fines" than the ½ in., it only carries about 2% oversize compared to 6 to 20% when using ½ in. screens. Therefore, it was suggested that the machine be equipped with screens having ⅜ in. openings and run at a speed which could only be determined accurately when the machine is in actual operation.

Byers Wrought Iron Pipe.—Burns Lyman Smith, owner of the L. C. Smith Building in Seattle, Washington, the tallest building in the world outside of New York City, said recently, while discussing the planning of this great structure: "Byers Genuine Wrought Iron Pipe was specified throughout. Every influence within reason was brought to bear upon the architects

and myself to change to steel, but the more I looked into the merits of wrought iron versus steel, the more convinced I became that Byers' Pipe was by far the best." Gaggin & Gaggin of Syracuse, N. Y., were the architects for the Smith Building.

The guarantee of quality offered by the A. M. Byers Company is based on the absolute control of all the steps in the manufacture of its pipe, from the time the ore is taken from the ground to the final delivery of the finished pipe to the purchaser. The non-corrosive quality of wrought iron is due chiefly to the puddling process. Realizing this, the Byers people have never varied from their old-time method of thorough hand puddling by expert puddlers. Byers pipe is made from all straight pig iron muck bar without the use of scrap of any description—no admixture of any foreign material whatsoever. Because of this refusal to substitute any material or methods that

would cheapen the quality of their pipe, the Byers Company have a reputation for quality control that is unique in the annals of pipe making.

Glutrin.—The Robeson Process Company has reopened its office in New Park Avenue. C. A. Rapello, secretary of the company, and Gordon I. Lindsay, agent for the State of New York, will both make their headquarters at the above address.

The Mixer.—Under this title the Koehring Machine Co., Milwaukee, Wis., is getting out a sixteen page, pocket size, monthly publication. Intended primarily to explain points in the construction of these machines, and illustrate their uses in interesting jobs under way, the little magazine digresses occasionally in the sphere of philosophy for the edification of the contractor and his foreman. Moreover, it prints a series of current jokes which they can use from time to time to cheer up the men in the gangs as they fag in the attempt to develop the ultimate capacity of their Koehring concrete mixer.

Highway Engineering

E. A. Kingsley Co., Southern Trust Building, Little Rock, Ark., has been awarded an engineering contract for $600,000 worth of construction at Temple, Tex. Mr. Kingsley will open an office in the City National Bank Building, Temple, Tex. He will not give up his Arkansas connections.

Asphalts

The Roadamite Paving Supply Co., offices H. W. Hellman building, Los Angeles, Cal., has been formed to handle asphalt and road oils. The trade names of the materials are: Roadamite Asphalt Cement and Sisquoc Asphalt Flux. The capital of the company is $400,000. The following are directors: C. Spicer; Charles Tukschulte; R. B. Best; George W. Baker and A. B. Chamberlain.

Highway Engineering.—The following lectures on highway engineering will be delivereed at Columbia University. Cards of admission may be obtained by persons interested by applying to Prof. Arthur H. Blanchard. The lectures are delivered at 8:30 P. M.

March 9—The Administration of Municipal Public Works, by Nelson P. Lewis, chief engineer, Board of Estimate and Apportionment, New York City.

March 16—The Essential Physical and Chemical Properties of Creosoting Oils for Wood Blocks, by C. V. Forrest, chief chemist, New York Testing Laboratory, Maurer, N. J.

NOTICE TO CONTRACTORS

NOTICE TO CONTRACTORS—State of New York—Office of the State Commission of Highways, Albany, N. Y.—Pursuant to the provisions of Chapter 30, Laws of 1909, as amended by chapter 646, Laws of 1911, and chapter 80, Laws of 1913, sealed proposals will be received by the undersigned at their office, No. 55 Lancaster St., Albany, N. Y., at 1 o'clock p. m. on Friday, the 6th day of March, 1914, for the improvement of the following highways.

County.	Rd. No.	Name.	Approx. Length.
Cattaraugus	5418	Carrollton-Kill Buck	4.41
Columbia	1112	Stockport Station-Stockport	1.85
Columbia	1113	Germantown-Clermont	5.80
Essex	1017	Port Henry-Westport	6.12
Greene	5369	Coxsackie Village	2.23
Jefferson	835	Adams Center-Tremains Cor.	7.04
Livingston	829	Livonia-Conesus Town Line	4.17
Madison	5447	Madison-Oriskany Falls	3.35
Monroe	760	Little Ridge, Part 5	3.83
Monroe	810	Victor-Mendon, Part 2	1.03
Ontario	5437	Phelps-Junius, Part 1	3.72
Schoharie	5444	Schoharie-Middleburg	5.59
Seneca	5446	Interlaken-Trumansburg	6.50
Suffolk	5301	Bay-Shore-Brookhaven	12.92
Westchester	5371	Larchmont Village	0.95
Westchester	5361	Briarcliff Manor Village	0.83
Westchester	5362	Tuckahoe Village	0.25

REPAIR.

Repair Cont. No.	Class of Work.	Road No.	Name.	Town.
			Broome.	
534	H. O. (No guarantee)	5022	Binghamton-Windsor, Part 1	Kirkwood
		5148	Binghamton-Windsor, Part 3	Windsor
			Chemung.	
531	Sur. Appl. "T" (No guarantee)	946	Fitch Bridge-Elmira	Elmira, Big Flats
			Columbia.	
536	Conc. Bit. (No guarantee)	5072	Livingston-Hudson, Part 1	Greenport
		5073	Livingston-Hudson, Part 2	Livingston
			Herkimer.	
540	Bit. Mac. (Guaranteed)	14	Frankfort-Utica, Part 1	Frankfort
539	Bit. Mac. (Guaranteed)	233	Frankfort-E. Schuyler	Schuyler
538	Bit. Mac. (Guaranteed)	459	E. Schuyler-Deerfield	Schuyler
			Lewis.	
516	Sur. Appl. Tar (No guarantee)	5036	Lowville-Martinsburg	Lowville, Martinsburg
			Monroe.	
529	Bit. Mac. (Guaranteed)	276	Barnard's Crossing, Secs. 1 and 2	Greece
			Oneida.	
532	Bit. Mac. (Guaranteed)	3	River Road	Deerfield
			Ontario.	
537	Bit. Mac. (Guaranteed)	607	Manchester-Clifton Springs	Manchester
			Suffolk.	
543	Bit. Mac. (Guaranteed)	5008	Jericho Turnpike, Sec. 1	Huntington
		5111	Jericho Turnpike, Sec. 2	
			Wayne.	
503	Sur. Appl. Bit. Mat. "A" (No guarantee)	993	Manchester-Palmyra	Palmyra

Maps, plans, specifications and estimates may be seen and proposal forms obtained at the office of the Commission in Albany, N. Y., and also at the office of Division Engineer Bertrand H. Wait, Realty Bldg., White Plains, N. Y., for contracts and highways in the counties of Columbia, Greene, Suffolk and Westchester; also at the office of Division Engineer Harvey O. Schermerhorn, Humane Bldg., Albany, N. Y., for highway in the county of Essex; also at the office of Division Engineer Theron N. Ripley, Cleveland Bldg., Watertown, N. Y., for highways and contracts in the counties of Jefferson and Lewis; also at the office of Division Engineer James H. Sturdevant, Chamber of Commerce Bldg., Utica, N. Y., for highways and contracts in the counties of Herkimer, Madison and Oneida; also at the office of Division Engineer Howard E. Smith, 901 Press Bldg., Binghamton, N. Y., for highways and contracts in the counties of Broome and Schoharie; also at the office of Division Engineer Charles J. McDonough, 433 S. Salina St., Syracuse, N. Y., for highways and contracts in the counties of Seneca and Wayne; also at the office of Division Engineer Perry Filkin, 423 Cutler Bldg., Rochester, N. Y., for highways and contracts in the counties of Livingston, Monroe and Ontario; also at the office of Division Engineer Frederick S. Strong, St. Ann Federation Bldg., Hornell, N. Y., for contract in the county of Chemung; also at the office of Division Engineer Wm. M. Acheson, Lockwood Bldg., Buffalo, N. Y., for highway in the county of Cattaraugus.

The especial attention of bidders is called to "Information for Bidders" in the itemized proposal, specifications and contract agreement.

Proposals for each contract must be presented in a separate sealed envelope endorsed on the outside with the number of the highway or repair contract for which the proposal is made. Each proposal must be accompanied by a draft or certified check issued by a national or state bank in good credit within the State and payable at sight to the order of the State Commission of Highways for an amount equal to at least five per cent. of the amount of the proposal which such draft or check accompanies.

This draft or check will be held by the Commission until the contract and bond are duly executed.

The successful bidder will be required to give a bond for fifty per cent of the amount of the contract, such bond to be executed by a Surety Company to be approved by the Commission, or a bond secured by the deposit of collateral securities to be approved by the Commission.

The right is reserved to reject any or all bids.

R. K. FULLER, Secretary. JOHN N. CARLISLE, Commissioner.

ADVANCE CONTRACT NEWS

ADVANCED INFORMATION
BIDS ASKED FOR

CONTRACTS AWARDED
ITEMIZED PRICES

To be of value this matter must be printed in the number immediately following its receipt, which makes it impossible for us to verify it all. Our sources of information are believed to be reliable, but we cannot guarantee the correctness of all items. Parties in charge of proposed work are requested to send us information concerning it as early as possible; also correction of any errors discovered.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
			STREETS AND ROADS	
Wis.,	Racine	10 a.m., Mar. 7	Paving with brick	P. H. Connelly, City Eng.
Ill.,	Evergreen	8 p.m., Mar. 7	Constructing cinder and cement concrete sidewalks	Bd. Local Impts.
Ia.,	Bettendorf	Mar. 7	1,400 sq. yds. concrete pavement; 4,203 sq. yds. brick pavement	Town Council.
Idaho,	Preston City	5 p.m., Mar. 7	Constructing sidewalk	J. N. Larsen, Mayor.
Idaho,	Wallace	Mar. 9	Paving construction	City Council.
Wash.,	Walla Walla	2 p.m., Mar. 9	Grading, draining and bridging 7 miles of highway	W. R. Roy, Sec. State Hwy. Bd., Olympia.
Pa.,	Scranton	Mar. 9	Constructing improved macadam road	C. P. Savage, Co. Controller.
Wash.,	Olympia	Mar. 9	Constructing 50 miles highway	State Hwy. Comm.
La.,	De Quincy	Mar. 10	60,525 sq. ft. concrete sidewalk; 14,480 ft. curb	T. H. Mandell, Engr. Lake Charles
Wis.,	Lake Geneva	Mar. 10	22,000 sq. yds. creosoted wood block pavement	A. G. Bullock ,City Clk.
O.,	Logan	noon, Mar. 10	Street improvements, 2 jobs	F. Allen, Village Clerk.
Kans.,	Manhattan	3 p.m., Mar. 11	60,000 sq. yds. asphaltic concrete pavement	O. E. Noble, City Engr.
O.,	Struthers	Mar. 11	Sidewalks, curbs, gutters, etc	J. Richards, Vil. Clk.
Md.,	Baltimore	Mar. 11	Paving with various materials	City Register, Bd. Awards.
O.,	Youngstown	Mar. 11	Constructing sidewalks, curbs and gutters	J. Richard, Clerk.
Ia.,	Nevada	Mar. 11	23 blocks paving, concrete or brick	City Clerk.
Ind.,	Kokomo	10 a.m., Mar. 12	Constructing stone road	E. B. Swift, Howard Co. Aud.
La.,	Lake Charles	10 a.m., Mar. 12	12,000 sq. yds. asphaltic concrete pavement and 7,300 lin. ft. concrete curb	A. Cook, City Clerk.
Ala.,	Lafayette	noon, Mar. 12	Grading and draining, and wooden flooring on bridges	J. J. Robinson, Jr., Judge of Probates.
Ky.,	Louisville	Mar. 12	Asphalt, vit. block and bituminous concrete construction and reconstruction	Board of Pub. Works.
N. Y.,	Buffalo	11 a.m., Mar. 13	Paving work	F. G. Ward, Comr. Pub. Wks.
O.,	Cincinnati	2 p.m., Mar. 13	Street improvement	A. Reinhardt, Clerk.
O.,	Toledo	10 a.m., Mar. 13	Grading, draining and macadamizing	Bd. of Lucas Co. Commrs.
O.,	Grand View Heights	noon, Mar. 14	Grading, draining and paving	B. W. Jones, Vil. Clk., Columbus P. O.
Ind.,	Fort Wayne	10 a.m., Mar. 16	Grading, draining and paving with stone	C. H. Brown, Co. Aud.
O.,	Galion	Mar. 16	7,000 sq. yds. brick pavement, and 1 mile brick with stone or concrete base	H. Hocker, Dir. Bd. Pub. Serv.
Ala.,	Luverne	Mar. 16	Improving county road, cost $10,542	W. S. Keller, State Highway Engr., Montgomery.
La.,	New Orleans	noon, Mar. 16	Paving 6½ miles	Highway Dept.
Ala.,	Luverne	Mar. 16	Paving work; 1,000 ft. in length and 6 ft. wide	J. N. Pollard, Clerk.
Ind.,	Brookville	1 p.m., Mar. 16	Macadam road	C. G. Reifel, Aud.
O.,	Cadiz	1 p.m., Mar. 16	1.25 miles water-bound macadam; cost, $7,629	E. P. Hines, Co. Aud.
N. J.,	Westfield	Mar. 16	14,000 sq. yds. 6-in. waterbound macadam	C. Clark, Twn. Clk.
Fla.,	Lake City	Mar. 16	2,600 sq. yds. reinforced concrete pavement	C. R. Horne, City Engr.
O.,	Cleveland Heights	noon. Mar. 16	Grading, paving and reconstructing sidewalks	H. H. Canfield, Vil. Clk.
Mont.,	Billings	Mar. 17	18,500 yds. of paving	L. E. Torrence, City Clk.
Ind.,	Brookville	1 p.m., Mar. 17	Constructing macadam road	Bd. Co. Comrs.
Wash.,	Spokane	Mar. 17	Constructing 26 miles highway	County Commrs.
O.,	Sandusky	noon, Mar. 17	Furnishing material and paving with brick	J. J. Molter, Dir. Pub. Serv.
Wis.,	Fond du Lac	3 p.m., Mar. 17	Furnishing material and paving with reinforced concrete	Bd. Local Imps.
Ia.,	Monticello	8 p.m., Mar. 19	12,400 sq. yds. paving; 10,350 ft. combined curb and gutter	C. J. Northrop, City Clk.
Wis.,	Kenosha	2 p.m., Mar. 20	Furnishing material and making street improvements	Street Assessment Committee.
Ind.,	South Bend	7.30 p.m., Mar. 20	Improving boulevard	Bd Park Comrs.
Ind.,	Green Castle	2 p.m., Mar. 21	Constructing gravel and macadamized highway	Bd. Comrs., Putnam & Hendricks Counties.
La.,	Breaux	Mar. 23	Constructing 12,000 sq. yds. cement walks with curbing	C. C. Rees, Mayor.
Fla.,	Jacksonville	Mar. 23	Paving two streets	Board of Bond Trustees.
Kan.,	McPherson	Mar. 23	Asphaltic concrete pavement and curb, cost $75,000	H. A. Roland, City Engr.
Minn.,	Fergus Falls	2 p.m., Mar. 24	Certain road tools and machinery	W. Lincoln, Aud. of Otter Tail Co.
Wash.,	Waterville	Mar. 24	Road work; cost, $25,000	L. T. Griswold, Co. Engr
O.,	Findlay	1 p.m., Mar. 26	Constructing water bound macadam road, 4 jobs	Co. Comrs.
Ind.,	Marion	10 a.m., Mar. 28	Furnishing crushed stone and road oil	W. T. Patten, Co. Aud.
Ind.,	Indianapolis	Mar. 28	200,000 gals. road oil, and 400 carloads of crushed stone	City Clerk
Ia.,	Atlantic	Mar. 30	Concrete paving, 50,000 sq. yds	E. Nicholas, City Clk.
Wash.,	Mt. Vernon	Apr. 1	Constructing 3 miles of highway; cost, about $35,000	Co. Comrs.
Tenn.,	Nashville	Apr. 1	Paving with various materials	W. W. Southgate, City Engr.
Man.,	Emerson	Apr. 1	Constructing concrete sidewalk; cost, $7,000	W. W. Unsworth, Clk.
N. J.,	Elizabeth	Apr. 1	50,000 sq. yds. bituminous concrete pavement	City Clerk.
S. D.,	Leola	3 p.m., Apr. 7	For Galvanized corrugated steel culverts	J. B. Whittmayer.
N. J.,	Newton	May 1	Improving 10 miles highway; cost, $100,000	H. Snock, Co. Engr.
			SEWERAGE	
Ind.,	Fort Wayne	Mar. 7	Constructing one mile ditch	C. H. Brown, Allen Co. Aud.
Ia.,	Garner	1 p.m., Mar. 9	Constructing drain	W. L. Fitkin, Co. Aud.
N. J.,	Newark	2 p.m., Mar. 10	Constructing foundations and connections for pumping station	J. S. Gibson, Clk. Passaic Valley Sew. Comn.
Mich.,	Lansing	Mar. 10	Constructing sewers, cost $27,000	R. F. Greg, City Clk.
Pa.,	Scranton	11 a.m., Mar. 11	Relief sewer system or lateral sewers	J. C. Hayes, Dir. Dept. Pub. Serv.
La.,	Lake Charles	10 a.m., Mar. 12	3,600 lin. ft. vitrified storm sewer pipe	A. Cook, City Clerk.
Neb.,	Wayne	8 p.m., Mar. 12	Sanitary sewer	J. M. Sherry, City Clk.
Ia.,	Sioux City	Mar. 14	About 5 miles 9-inch vit. pipe sewer	P. J. Wells, City Clk.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
Va.,	Lynchburg	Mar. 15.	Furnishing sewer pipe	H. L. Shaner, City Eng.
O.,	Cleveland Heights	Mar. 16.	Sewer construction	H. H. Canfield, Vil. Clk.
Iowa,	Denison	Mar. 20.	3,500 lin. ft. 6 to 8-inch vitrified pipe sewer extension	H. B. Fischel, City Engr.
N. J.,	Woodbridge.	9.30 a.m., Mar. 20.	Constructing vit. pipe sewer	A. Keyes, Twp. Clerk.
Tenn.,	Greeneville	Mar. 24.	Constructing sanitary sewers	G. W. Glick, Recorder.
Cal.,	Mare Island	10 a.m., Mar. 24.	Furnishing quantity terra cotta sewer pipe	T. J. Cowie, Paym. Genl., U. S. N., Wash., D. C.
Ia.,	Council Bluffs	2 p.m., Mar. 26.	Constructing ditch	J. B. Hannan, Auditor.
Neb.,	Omaha	Apr. 1.	Extending outlet of 18-inch sewer; purification works; cost, $18,000	E. R. Hune, Clerk.
Neb.,	Dundee	Apr. 1.	Extending outlet of 18-inch sewer and sewage disposal works; cost, $18,000	F. W. Slabaugh, Mayor.
Mo.,	Poplar Bluff	7.30 p.m., Apr. 6.	Constructing sanitary sewers, cost $25,756	E. C. Thomas, City Engr.
Ill.,	Rankin	Apr. 15.	Constructing storm and sanitary sewer system	J. W. Shepard, Vil. Clk.

WATER SUPPLY

D. C.,	Prince Rupert	Mar. 7.	22,000 lap-welded steel water pipe	City Clerk.
Mich.,	Highland Park	Mar. 10.	2,000,000-gallon reinforced concrete reservoir	L. H. Beckley, Supt. P. W.
Sask.,	Saskatoon	Mar. 10.	12 tons 12-in. and 65 tons c. i. pipe; 13 tons specials; gate valves, etc.	E. E. Harrison, Mayor.
N. Y.,	Rochester	11 a.m., Mar. 11.	Furnishing 8 miles 37-inch c.-i. pipe, etc	F. X. Pifer, Secy.
O.,	Marietta	noon, Mar. 12.	Furnishing 2,500 ft. of water mains	J. W. Frye, Dir. Pub. Serv.
Pa.,	Danville	Mar. 12.	Sedimentation tanks, chemical house, etc	W. F. Lowry, Sec. Bld. Com.
Alta.,	Edmonton	Mar. 12.	Fire hydrants, gate valves, water meters, etc	City Comn.
Ill.,	Rock Island	Mar. 13.	500,000-gallon steel water tank	W. Treichler, City Engr.
Ariz.,	Douglas	Mar. 14.	Furnishing quantity of cast iron pipe	City Water Comr.
Cal.,	Colton	Mar. 15.	Constructing 1,500,000 gal. reservoir; cost, $6,000	N. Davenport, City Clk.
Ill.,	Wilmington	Mar. 17.	Laying about 11,000 ft. water mains, setting hydrants, &c.	L. Monsen, City Clerk.
Cal.,	Montague	Mar. 23.	Constructing water works	A. H. McClelland, Ch. Twn. Trs.
O.,	Junction City	Apr. 1.	Constructing water works, about $16,000	H. L. Maddocks, Engr., Newark.
Ia.,	Muscatine	Apr. 14.	Pumping plant	Co. Supvrs.

LIGHTING AND POWER

Utah,	Salt Lake City	Mar. 7.	Furnishing and installing electric lighting fixtures	University of Utah.
N. J.,	South River	8 p.m., Mar. 9.	Addition to electric lighting plant	C. Anderson, Boro. Clerk.
N. J.,	Seabright	3 p.m., Mar. 9.	Furnishing lamps and current for 5 years	J. Lindsay, Boro. Clerk.
Minn.,	Willmar	8 p.m., Mar. 9.	Two engines and electrical equipment	H. Gunderson, City Clerk.
Utah,	Green Fountain	Mar. 10.	Equipping new power plant	E. Anderson, Supt.
Minn.,	St. Paul	2 p.m., Mar. 10.	Heating, ventilating and electrical construction of public library	Board of Library Dir.
Cal.,	Napa	Mar. 10.	250-H.P. water tube boiler and oil burning furnace	W. F. McClure, State Engr., Sacramento.
Tex.,	Dallas County	Mar. 11.	Installing high and low pressure power plant, with full equipment	County Commissioners.
Minn.,	Minneapolis	Mar. 12.	Constructing power house	Minneapolis Gen. Elec. Co.
R. I.,	Newport	11 a.m., Mar. 14.	Underground electric distributing system	H. R. Stanford, Ch. Bureau Yds. & Docks, U. S. Navy, Wash., D. C.
Kan.,	Manhattan	Mar. 17.	Triplex power or motor and centrifugal pump	O. E. Noble, City Engr.
Minn.,	Lismore	Mar. 18.	Constructing municipal electric light plant	M. Smith, Vil. Recorder.

FIRE EQUIPMENT

Minn.,	St. James	8 p.m., Mar. 9.	Furnishing 500 ft. fire hose	C. Larsen, City Recorder.
Ariz.,	Phoenix	Mar. 17.	Furnishing new apparatus	City Clerk.
Que.,	Montreal	Mar. 26.	One pumping engine; one 85-ft. aerial truck; four tractors; two hose wagons and one salvage wagon	J. R. Tremblay, Chief.

BRIDGES

Ind.,	Greenfield	10 a.m., Mar. 7.	Constructing bridge	L. Wood, Hancock Co. Aud.
O.,	Cambridge	11 a.m., Mar. 7.	Constructing 100-ft. stand bridge	T. C. White, Guernsey Co. Aud.
Tex.,	Austin	Mar. 7.	Reinforced concrete bridge	C. Hurpertz, Co. Aud.
Iowa,	Cedar Rapids	10 a.m., Mar. 9.	Constructing reinforced concrete bridge	L. J. Storey, City Clerk.
Va.,	Marion	Mar. 9.	Constructing 115-ft. span bridge	Board Supervisors.
Kan.,	Topeka	noon, Mar. 9.	Constructing various bridges	Bd. County Comrs.
O.,	Coshocton	Mar. 10.	Reconstructing bridges; cost, $65,000	County Commissioners.
Minn.,	New Ulm	2 p.m., Mar. 10.	Constructing concrete and steel bridges	County Auditor.
Ia.,	Knoxville	1 p.m., Mar. 10.	106 bridges and culverts	J. B. LeMere, Co. Aud.
O.,	Dayton	10 a.m., Mar. 11.	Constructing bridge; steel super-structure and concrete sub-structure	W. H. Aszling, Sec. Co. Comrs.
W. Va.,	Clarksburg	noon, Mar. 12.	Erecting concrete bridge, 581 ft. span	D. D. Britt, Engr.
O.,	Cleveland	Mar. 14.	Constructing bridge work	E. G. Krause, Clerk.
Ind.,	Brookville	11 a.m., Mar. 17.	Constructing several bridges	Bd. Comrs., Franklin Co.
Neb.,	Ord	5 p.m., Mar. 17.	Constructing all bridges for the year	O. Murschel, Co. Clerk.
Pa.,	West View	8 p.m., Mar. 18.	Constructing 2 reinforced concrete arch bridges	C. A. McClain, Boro. Clerk.
Neb.,	Gordon	noon, Mar. 20.	Constructing all bridges for the year	H. F. Wasmund, Co. Clerk
O.,	Columbus	Mar. 20.	Reinforced concrete bridge	County Commissioners.
Neb.,	Rushville	noon, Mar. 20.	Bridge construction for 1914	H. F. Wasmund, Co. Clerk.
Pa.,	Ebensburg	noon, Mar. 23.	Constructing three reinforced concrete bridges	Comrs. Cambria County.
O.,	Columbus	noon, Mar. 23.	Constructing reinforced concrete arch bridge	F. M. Sayre, Co. Aud.
Minn.,	Winona	2 p.m., Mar. 26.	Constructing 10 concrete culverts; cost, $32,865	C. A. Anding, Co. Aud.
Ind.,	Peru	Apr. 1.	Constructing 120-ft. span bridge; cost, $8,000	E. McElhaney, Aud.
S. D.,	Salem	2 p.m., Apr. 7.	Furnishing galv. corrugated metal culverts for the year.	A. E. Ecklein, Co. Aud.
Ore.,	Gold Beach	5 p.m., Apr. 9.	Reinforced concrete bridge to cost $35,000	J. M. Caughell, Co. Sur.

MISCELLANEOUS

Ill.,	Chicago	11 a.m., Mar. 7.	Reduction plant requires switchboard and pump	G. B. Young, Comr. of Health.
N. D.,	Williston	3 p.m., Mar. 9.	Constructing post-office	O. Wenderoth, Super. Arch., Washington, D. C.
Ariz.,	Kingman	Mar. 9.	Erecting $70,000 court house	Co. Bd. Supervisors.
Minn.,	Staples	8 p.m., Mar. 10.	Constructing a jail	F. W. Findsen, City Clk.
Ill.,	Chicago	11 a.m., Mar. 10.	Furnishing three squeegee machines	L. E. McGann, Comr. of Pub. Works.
Kan.,	Osage	Mar. 11.	Constructing post office	O. Wenderoff, Sup. Architect.
Mo.,	De Soto	Mar. 13.	Constructing post office	O. Wenderoth, Superv. Arch., Wash., D. C.
Ga.,	Bainbridge	Mar. 14.	Constructing post office	O. Wenderoth, Superv. Arch., Wash., D. C.
N. J.,	Camden	8 p.m., Mar. 17.	Constructing timber bulkhead	F. S. Van Hart, Ch. Com. Wharves and Docks.
O.,	East Liverpool	noon, Mar. 21.	Motorized police patrol	N. H. Vodrey, Dir. Pub. Serv.
Panama,	Canal Zone	11 a.m., Mar. 28.	Furnishing four steel towers	H. R. Stanford, Chf. Bureau Yds. & Docks, Wash., D. C
Ind.,	South Bend	11 a.m., Apr. 6.	Ten road rollers, and one 20-bbl. sprinkling wagon	C. Sedgwick, Auditor.
Mo.,	Richmond	May 1.	Constructing court house; cost, $100,000	J. J. Pardue, Co. Treas.

STREETS AND ROADS

Birmingham, Ala.—Marion county commissioners have sold $100,000 worth road bonds to William R. Compton Bond and Mortgage company of St. Louis.

Globe, Ariz.—Cost of proposed Globe-Winkelman road is from $75,000 to $100,000, and survey is expected to be completed by Engineer Julius Milton within two weeks. Building of road will depend to some extent upon State Supreme Court's decision as to whether or not counties are allowed to bond themselves for such purposes.

Chico, Cal.—Committee of Chico Business Men's Association has continued its campaign to secure fund of $10,000 with which expenditure of $200,000 of State Highway funds in construction of the highway through this section is to be obtained.

Hartford, Conn.—Plans have been approved for widening of Church st.

Wilmington, Del.—Council has given final reading to ordinance authorizing loan of $150,000 for street work. Ordinance was sent to mayor for his approval.

New Castle, Del.—Legislature has passed act giving city right to issue bonds in sum of $30,000 for street improvements.

Washington, D. C.—Improvements of certain streets in central section have been urged by Central Citizens' Association. It went on record as favoring repaving of 1st St. northwest, from Pennsylvania Ave. to E St., and from G to I Sts, and H St., from 1st to 4th St.

Jacksonville, Fla.—At meeting of committee on public works estimates were asked for paving of Main st. from Hogans Creek to 8th st. of Superintendent John E. Ballenger of Highway Department of City Engineering Department. Estimates for both asphaltic concrete and dolarway paving were asked for, these estimates to be submitted at next meeting of the committee.

In revised estimates asked for paving of Riverside ave. from the viaduct to Lackawanna ave., total amount for asphaltic concrete was placed at $16,688.98; $972.40 being amount estimated for Jacksonville Traction Co.; $3,238.80 for city's one-third, and for two-thirds to be taken care of by abutting property owners, $10,477.72.

This estimate calls for asphaltic concrete on 5-in. concrete base, the cost per square yard being estimated at $2,-. 403.87.

St. Augustine, Fla.—Manatee proposes to issue good roads and bridge bonds to amount of $550,000. Bond election will be held March 17.

Rising Fawn, Ga.—Election has been ordered by County Ordinary Claude S. Turner to be held on March 25, at which time it will be determined whether or not Dade County will issue bonds aggregating $60,000 for purpose of constructing main thoroughfare through Dade County, from Tennessee line on north to Alabama line on south.

Evansville, Ind.—County Treasurer Carl Lauenstein has sold $20,000 of road improvement bonds to J. F. Wild & Co., of Indianapolis.

Indianapolis, Ind.—Survey has been completed and tentative plans prepared by Board of Park Commissioners for Indianapolis Chamber of Commerce for proposed roadway or boulevard to connect city with Ft. Benjamin Harrison. It is understood that petitions are to be circulated at once among property owners. Plans as prepared by Park Board contemplate highway 100 ft. wide. There would be gravel roadway 40 ft. wide, with lawn space 30 ft. wide on either side. Estimated cost, exclusive of right-of-way that will be needed, is approximately $100,000.

Rushville, Ind.—People's National Bank of this city has obtained five county road bond issues sold here, amounting in all to $28,620 for par, accrued interest and $426.50 premium.

Vincennes, Ind.—Petition has been filed asking for concrete road in Knox county. The road would pass entire length of fair-grounds on Fairground Ave.

Muscatine, Ia.—County Engineer Ryan is making county highway survey.

Hoisington, Kan.—Farmers living north of this place on Smoky Hill River are preparing to petition County Commissioners for county road leading to Hoisington.

Bowling Green, Ky.—Campaign will shortly begin for $300,000 road bond issue in Warren County.

Barbourville, Ky.—Harlan county magistrates are planning system of good roads to be constructed throughout county, radiating from Harlan, county seat. Surveys are being made and it is stated that arrangements will be made to begin work on roads this summer.

Middlesboro, Ky.—Council has voted $100,000 ten-year bonds for street improvement. Every street in city will be macadamized and macadam will be covered with coating of asphalt.

Middlesboro, Ky.—Council has voted $100,000 ten-year bonds for street improvement.

Somerset, Ky.—County Judge Robert Jasper has called special election to be held on April 17 for purpose of voting on bond issue of $300,000 to build pikes in Pulaski County.

Versailles, Ky.—City Council is working on plan to have Main St. paved with vitrified brick or asphalt for distance of three blocks in business centre, from Broadway on north to Morgan St. on south, expense to be borne one-third by city and two-thirds by property owners on street. Approximate cost, it is believed, will be between $20,000 and $25,000.

Lafayette, La.—The Second Ward has voted a 5-mill tax for five years for roads and drainage.

Baltimore, Md.—Paving Commission is ready to repave Charles St. from Chase St. to North Ave. Specifications have been drawn and work will be started in near future. Sheet asphalt will be used in area outside car tracks and vitrified bricks will be laid between tracks except in immediate locality of Union Station, where granite blocks will be laid between tracks. Paving Commission is also ready to repave Eager St., from Park Ave. to Cathedral St.; Howard St., from Park Ave. to Cathedral St., and Park Ave., from Richmond St. to Lanvale.

Baltimore, Md.—Commissioners for Opening Streets has submitted to Board of Estimates additional list of streets to be paved this year. An ordinance will be sent to City Council embodying additional streets, which are about 26 in number.

Lenox, Mass.—Voters will be asked to appropriate $10,000 for roads.

Benton Harbor, Mich.—The final $10,000 block of county road bonds for first year has been disposed of by committee in charge of that department of supervisors' work.

Niles, Mich.—Supervisor Herman Roebeck of Niles, chairman of road bond committee of Board of Supervisors, has announced that $10,000 of $100,000 issue authorized to be sold this year has been taken by Niles citizens.

Duluth, Minn.—City Council has passed two resolutions directing paving of Woodland Ave., between Fourth St. and Victor St., this season.

Minneapolis, Minn.—City may readvertise for bids on creosote paving blocks in effort to obtain lower price.

St. Joseph, Mo.—Activities looking toward building of boulevard A, running from Thirtieth St. along Patee to Thirty-first and thence south to Mitchell Ave., are to be begun at once by park board.

Waynesboro, Miss.—Wayne County has sold its good roads bonds for $100,000 and on March 1 will begin highway construction.

Norfolk, Neb.—It will cost approximately $22,671.29 to pave intersections of four proposed districts, according to report filed with city clerk by City Engineer Tracy. City engineer explains that about $9,000 is on hand in intersection fund which can be used immediately. This means that city will have to vote approximately $15,000 intersection bonds for new paving.

Omaha, Neb.—Bonds in sum of $361,500 have been sold to Spitzer, Roeick & Co. of Toledo, O. City will take up about $135,000 worth of street improvement bonds by June 1.

Elizabeth, N. J.—Ordinances have been approved for various street improvements.

Albany, N. Y.—Provision for repair of public highways on Onondaga Indian reservation is made by bill offered by Assemblyman Alexander Macdonald, chairman of Ways and Means Committee. Bill carries appropriation of $68,000 and applies to highways and bridges on all reservations.

Albany, N. Y.—Highway improvement for Niagara and Orleans counties involving expenditure of $400,000 is provided for in bill introduced by Senator Thompson. He proposes following routes: Niagara Falls to North Tonawanda via River road; Medina west through Middleport, Gasport and East Ave. in Lockport; Ridgeway east along the ridge road to county line. He says that people have voted $254,000 for state highways in Niagara County and $163,000 for Orleans County.

Binghamton, N. Y.—Ordinance has been passed for paving of Riverside Drive, and plans are being made for extending Tompkins st.

Dunkirk, N. Y.—Meeting will be held to consider plans and specifications prepared by State Highway Department for improvement of highway extending along west side of Chautauqua Lake and past the Chautauqua assembly grounds.

Monticello, N. Y.—Paving of streets is being discussed.

Newburgh, N. Y.—Street Committee of City Council has decided to ask for $600 for purchase of oil sprinkling apparatus for use on streets.

Peekskill, N. Y.—Washington St. paving bonds have been awarded to Douglas Fenwick & Co.

Riverhead, L. I., N. Y.—Supervisor Rogers of Islip has announced that he has succeeded in getting State Highway Department to prepare for immediate improvement of road from Islip to Smithtown that passes front of State Hospital at Islip.

Schoharie, N. Y.—At village election to be held in March taxpayers of village of Schoharie will vote upon proposition to co-operate with State of New York in building extra 16 ft. of road through village. If proposition is lost, State will not build road. It is Schoharie-Middleburgh road and is 5.56 miles, which begins at Vroman's farm and continues to Middleburgh.

Scotia, N. Y.—Voters of Scotia will be called upon at village election in March to decide whether they want a road built along Ballston Ave. from Mohawk Ave. to village line. Cost to village will be about $28,000 and estimates provide for wide road.

Watertown, N. Y.—Bids have been received for construction of combined concrete curb and gutter in South Indiana Ave., from State St. to Academy St., and for construction of similar sewer in North Massey St., from Arsenal St. to Court St. Bids were referred to city engineer to compute. Bids were received on each as follows: Indiana Ave., C. J. Haley, 63 cts. per ft. for curbing and 12 cts. a ft. for sidewalks; Allard & Lavine, 69 cts. a ft. for curbing and 12 cts. a foot for sidewalks; North Massey St., C. J. Haley, 63 cts. a ft. for curbing and 12 cts. a ft. for sidewalks; Allard & Lavine, 76 cts. a ft. for curbing and 12 cents a foot for sidewalks.

Hendersonville, N. C.—City Commissioners have contracted to sell to Spitzer & Co., Toledo, O., the $50,000 bonds for paving Fifth Ave.

Akron, O. —More than $260,000 will be spent on roads in Summit county this year, exclusive of market roads, which will be improved entirely by state. Of this amount, about $200,000 will be spent under Dodge law, which is, that county will spend that much without any help from state. About $30,000 will be received from state under Hites bill. This amount must be met with equal amount from state, making about $60,000.

Dayton, O.—Bids will be received at office of H. E. Wall, city accountant, until noon, March 30, for purchase of bonds in sum of $14,500 for paving various streets and alleys.

Defiance, O.—Petitions have been received for paving of four streets.

Salem, Ore.—The West Stayton Commercial Club has petitioned County Court asking that portion of $850,000 bonds, which it is proposed to issue by county, be used in building road from Salem to Turner and West Stayton.

Hazelton, Pa.—City proposes to crush its own stone for repairs to streets. A portable machine to be operated with gasoline will be purchased. A scarifier and power tamping machine are also contemplated according to appropriations now being made.

Northampton Heights, Pa.—Town will vote in April on $30,000 street improvement loan.

Vandergrift, Pa.—E. M. Bigelow, State Highway Commissioner, and Westmoreland County Commissioners, have given assurance that new road between Scottdale and Vandegrift and passing through Greensburg, Delmont, North Washington and other towns will be built this year.

Providence, R. I.—Committee on highways has voted to recommend to City Council appropriation of approximately $95,000 for permanent bitulithic paving of Elmwood Ave. from Bridgham St. to railroad bridge near Roger Williams Park.

Greenville, S. C.—A bill whose purposes the permanent improvements of roads of Greenville County, carrying annual appropriation of $47,000 for that purpose, has now passed house of representatives, and is pending in the senate.

Sioux Falls, S. D.—Specifications for paving of Minnesota Ave., from north side of Fourth St. to south side of 26th St., and Ninth St., between Dakota and Minnesota Aves., together with resolutions declaring it necessary to pave those streets, have been acted upon by Board of City Commissioners. At 9 o'clock on the morning of Monday, March 23 resolutions will be brought up for hearing.

Sioux Falls, S. D.—City commissioners have been petitioned to turn 21st St. into a boulevard.

Bristol, Tenn.—The $100,000 bond issue for roads in Sullivan County, less the $10,000 to be set aside for building streets in Bristol, will be expended in grading and macadamizing large number of roads.,

Bristol, Tenn.—Sullivan County Court, at an adjourned session held at Blountville, has adopted report of special committee appointed in January, recommending another bond issue of $100,000 for road purposes.

Chattanooga, Tenn.—County Judge Will Cummings has awarded bridge bond issue of $600,000, including $500,000 for building the Market St. bridge and $100,000 for repairing Walnut St. bridge, to Harris Trust & Savings Bank Co., of Chicago.

Chattanooga, Tenn. — Commissioner Sloan has recommended that in view of proposed erection of viaduct on East End Ave., avenue should be paved from 11th St. to Rossville Ave. Other suggestions as to streets to be improved under abutting property law is paving of Vance Ave., the, improvement of Willow St. Highland Park Ave., between George St. and Main St. to be paved, and Chestnut St. paved between 24th and 25th Sts.

Clarksville, Tenn.—Road Commissioners of this county have made their bonds and have determined to use their money in road building upon co-operative plan. They met number of citizens of Ringgold section who put up a $4,000 cash subscription to build a 12-foot pike 4½ miles from Ringgold to Kentucky line.

Ducktown, Tenn.—Polk County having successfully placed a $250,000 5 per cent. pike bond issue and county now having money placed to its credit, pike commissioners expect to begin actual work as soon as possible.

Johnson City, Tenn.—Fifty thousand dollars will be spent in paving streets in Johnson City.

Knoxville, Tenn.—Petition is being circulated for improvement of Ninth St.

Park City, Tenn.—Resolution for paving of several blocks of Magnolia Ave. in Park City will be introduced by Alderman Charles E. Hunter at meeting of Park City council.

Middlesboro, Tenn.—Streets of Middlesboro are to be rebuilt. City Council has authorized issuance of $100,000 in ten-year bonds for this purpose.

Pikeville, Tenn.—County court has called election for March 28 to give people opportunity to say whether or not they want to bond county for $95,000 to build pike roads.

Bartlett, Tex.—In addition to three macadamized roads leading out of this place, contracts have been let for construction of following roads: Six miles west from city limits to Goodville; 7 miles east of city limits to Donahoe; 3 miles north toward Holland, also road leading to Fowler's gin will be completed.

Beaumont, Tex.—Improvements to cost about $14,000 are being planned to be made to Railroad Ave.

Belton, Tex.—Commissioners' Court has rejected all bids for road improvement work in Bartlett good roads precinct and will advertise for new bids. Contract for doing $30,000 improvement on Heidelheimer-Burgess precinct roads has been let to W. T. Montgomery of San Antonio.

Belton, Tex.—Petition signed by one hundred and twenty-four voters of Killeen Independent School district has been presented to commissioners' court praying for election on issuing of $50,000 bonds for road improvement.

Elgin, Tex.—In election held here for voting bonds for improvement of roads, bonds carried by majority of 6 votes over required two-thirds majority.

Fort Worth, Tex.—Plans and specifications prepared by engineer for graveling one-fourth mile of Oak Grove road, near George Vaughn's place, have been approved and auditor was instructed to advertise for bids thereon; also plans and specifications of engineer for graveling one-half mile of Grapevine and Dallas road in precinct No. 3 have been approved and the auditor instructed to advertise for bids.

Greenville, Tex.—Board of Permanent Road Commissioners of Kent County has retained Julian C. Field, Consulting Engineer, 105 Field Bldg., Denison, to design and supervise system of highways for which $400,000 has recently been voted.

Houston, Tex.—Appropriation of $100,000 has been made for improving of Main Street Extension Boulevard.

Houston, Tex.—Eight important roads of Harris county and two modern bridges have been finally decided upon by County Commissioners for immediate improvement. While no approximation of cost of road and bridge work finally decided upon was made, it is known that it will take large part of $1,000,000 bond issue for roads and bridges.

Itasca, Tex.—Road bond issue of $150,000, in road precinct No. 2, has been carried in election.

McKinney, Tex.—Five districts in Collin county have voted on bond issues for road improvements as follows: Farmersville, $200,000; Princeton, $100,000; Culleoka, $65,000; Celina, $125,000; Prosper, $100,000; Totals, $590,000. Election for Frisco district has been ordered for March the 16th, at which time its tax-paying voters will pass on proposed bond issue of $65,000 for building of piked roads in that territory.

San Antonio, Tex.—City and county have come to complete agreement as to certain improvements to be made under recently voted $1,000,000 county bond issue. General plan contemplates improvement of certain main artery county roads to points within city limits, at which places they will be connected with paved streets. Agreement as to improvement of following roads to points indicated has been reached after thorough investigation and inspection trip over highways by representatives of both city and county: The Castroville road will be brought into the city on Guadalupe St. to Zarzamora St., thence north to Zarzamora to West Commerce St. The Frio City road (Pearsall road) will be brought in on Brazos St. to a point on that street one and a fourth miles within the city limits. The Somerset road will be improved to the San Pedro Creek bridge at the intersection of Glass St. and Somerset Blvd. The Pleasanton and Corpus Christi road will be brought into the creek at or near the south line of Hill Crest Addition. These highway arteries are to be modernized under the bond issue to city points stated.

Sulphur Springs, Tex.—Bond issue to macadamize country's public roads is being agitated by many farmers of county.

Temple, Tex.—Both city and country delegations of citizens' committe of road improvement district have decided on ordered by Counay Claus S. Beveridge roads and streets to be improved with proceeds of $600,000 bond issue. According to plans of committee there will be six main roads or arteries leading from public square in Temple to far extremes of district. The highways included in those to be improved are: Little River-Heidenheimer, Troy-Pendleton, Seaton, Oenaville-Ocker-Bell Falls. Fryr Creek and the Cedar Creek road. This will give two improved roads to east of Temple, one to north, one west and two leading south.

Tyler, Tex.—Tyler road district bonds amounting to $300,000 have been sold to State Bank and Trust Company of this city. Work of construction of new road will commence early in spring.

Vernon, Tex.—Street and school house bonds in sum of $32,000 have been sold. Work on streets will be commenced as soon as money is available.

Waco, Tex.—Building of road from Glen Rose to Waco is being discussed. Length of road is 100 miles.

Wichita Falls, Tex.—Bond issue of $50,000 for better roads is planned for Wichita county.

Wharton, Tex.—City Council has appointed committee to negotiate with property owners for opening of two streets, one connecting Milam and Residence st., other in eastern part of city. Both are only connecting links that will open up lengthy thoroughfares.

Brigham City, Utah.—Numbers of streets in this city will be graded during coming spring. It is proposed to gravel Second West between Forest and First North; First North between First West and Second East, and Third South between Main St. and city cemetery on Fourth East.

Eureka, Utah.—Considerable money will be available this year for improvement of county roads and large amount of funds will be expended in Tintic district. Entirely new road will be constructed between Eureka and Silver City, which will do away with two railroad crossings. The road around the mountain also will be widened just as soon as weather will permit.

Salt Lake City, Utah.—On recommendation of Commissioner Morris commission has appropriated $3,750 to pay city's portion of cost of grading Fifth East for paving between Ninth South and Tenth South.

Gate City, Va.—Floyd magisterial district, situated on Wise and Russell county lines, will vote on April 21st on question of issuing road bonds to amount of $41,000.

Norfolk, Va.—Following improvements have been recommended: Curbing, guttering and grading of Calvert St. east of Park Ave., $4,600, and Ruffin way from 26th to 28th Sts. $500.

Charleston, W. Va.—People will vote shortly on bond issue for following work: 4,600 ft. combined curb and gutter, 6x24 ins.; 73,620 ft. of 6x18 in. concrete curb; 153,850 sq. yds. grading and paving, and 5,000 ft. of 6x12 in. marginal curb or edging.

Olympia, Wash.—Contracts will be let for about $750,000 worth of highway construction within next few weeks, if plans of Highway Board materialize, bids on various stretches to be entered March 2 and March 15.

Seattle, Wash.—Plans have been approved for grading of Twenty-seventh Ave., N. E., Dearborn St. and 26th Ave., S. W.; also for paving Pike Pl. and laying sidewalks on Queen Ann Blvd.

Milwaukee, Wis.—Plans have been completed for construction of 5-mile concrete highway to Oconomowoc, to cost about $750,000.

Racine, Wis.—Paving of Thurston Ave. has been authorized.

CONTRACTS AWARDED.

Little Rock, Ark.—To M. D. L. Cook, 315 Southern Trust Bldg., city, at $49,000, for 16,000 sq. yds. of bitulithic paving in District No. 220.

Little Rock, Ark.—For construction of 13 miles of roads between Star City and Terry in Improvement Dist. No. 1, to T. H. Bunch of Little Rock, at $41,165 for gravel or $64,177 for macadam.

Bakersfield, Cal.—For constructing asphalt pavement curbs and gutters on S. Chester Ave. to Federal Constr. Co., at $45,083.

Los Angeles, Cal.—For 117,975 sq. ft. asphalt pavement on W. 2d St., between Fries and "J" St., in Wilmington Dist. to Fairchild-Gilmore-Wilton Co., Pacific Electric Bldg., at about $84,886; also for 44,968 sq. ft. asphalt pavement on Georgia St. to Barber Asphalt Paving Co., of Los Angeles, at $8,321.

Park Ridge, Ill.—By Board of Local Improvements to Boyd & Graziano, 1145 Milton Ave., Chicago, at $4,544.52, for constructing 26,697 sq. ft. cement concrete sidewalk in Park Ridge.

Rantoul, Ill.—By Board of Local Improvement, for two paving contracts for brick pavement on gravel concrete foundation with concrete curb and gutter aggregating 2¼ miles, from plans of Green & Palmer, Urbana, to Foley Construction Co., Chicago, $42,075. Other bids as follows: A. D. Thompson Co., Peoria, $42,736; H. C. Finley, Hoopston, $44,023; Pronger & Fletcher, Blue Island, $42,481.

Pana, Ill.—To W. F. Sell, city, at $32,102, for 14,312 sq. yds. of brick pavement; also 7,337 cu. yds. of excavation, 9,937 lin. ft. of curb and gutter, and 1,200 ft. of storm water drains and 8 inlet boxes.

Ft. Wayne, Ind.—For construction of Sheehan Stone Road about one mile long in Monroe Township by Board of County Commissioners to H. G. Ireland, at $5,497.

Kentland, Ind.—To W. W. Evans, of Fowler, at $12,160, for construction of Chancellor stone road.

Muncie, Ind.—By Board of Commissioners of Delaware County to Snider, Barrett & Jenkins, Frankfort, Ind., at $10,895, for constructing Millspagh Road in Harrison Township.

Terre Haute, Ind.—By Board of County Commissioners, for construction of Mullikin road, to extend from 30th st. to foot of Blake Hill and to be brick pavement, to Bowen Construction Co., of Terre Haute, $49,647. Other bids as follows: C. A. Williston, of Gary, $54,400; Ewing Shields, Greencastle, $53,858; W. H. Harris, $54,000; Foulkes Construction Co., $53,957; Keegan Bros., of Brazil, $53,888; Hawkins Bros., Brazil, $52,878.

Sac City, Ia.—For paving as follows: 28,985 yds. asphaltic concrete, to Ford Paving Co., of Cedar Rapids, at $1.61½ and to the Western Construction Co., of Iowa City, for 3,220 yds. sand-filled

brick, at $1.96½ and 5,435 yds. concrete at $1.24 per sq. yd.

Federalsburg, Md.—State Roads Commission has awarded contract for completing state road between Federalsburg and Denton to Chesapeake Construction Co. of Preston, for $82,005.02.

Boston, Mass.—By Department of Public Works for repairing asphalt or bithulithic pavements to Central Construction Co., 6 Beacon St., Boston, at $32,600. Other bidders were: Warren Brothers Co., $33,250, and the Boston Paving Co., $35,400. The contract for repairing artificial stone sidewalks has been awarded to Jeremiah J. Sullivan, Boston, at $1,675.

Detroit, Mich.—By Council Committee on Streets, contracts for cedar block paving, as follows: Cavalry Ave., from Fort St. to Dix Ave., J. A. Mercier, $21,066.82; Delaware Ave., from Hamilton Blvd., to Merrill St., Julius Porath, $3,994.24; Hulburt Ave., from Charlevoix St. to Mack Ave., J. A. Mercier, $12,585.79; Pennsylvania Ave., from Mack Ave. to alley south of Gratio Ave., Thomas E. Currie, $50,-208.40. Bids for paving two alleys were also accepted by the committee, Julius Porath getting one at $1,785.24, and J. T. Ladue the other, at $1,373.89.

Bemidji, Minn.—County Commission following road contracts: Road Construction Co., Grand Rapids, Wis., $6,800; Tom Smart, city, $5,297; Nels Johnson, Kelliher, Minn., $11,712; John Moberg, city, $21,034, and Tom Smart, city, $5,-547.

St. Paul, Minn.—For paving of 259,-273 sq. yds. with creosote blocks by Chicago Creosoting Co., of Chicago, Ill., at $1.25⅞ per sq. yd.

St. Louis, Mo.—By Board of Public Improvements, following contracts for street paving: Wood block and vitrified brick paving, G. Eyermann & Bros. Construction Co., 1210 S. Grand Ave., $20,000 and $44,000, respectively; vitrified brick paving, T. E. Cavanagh, 4919 Easton Ave., $10,000; vitrified brick paving, Ruecking Constr. Co., Marine and Gasconade Sts., $11,000; asphalt paving, Barber Asphalt Paving Co., Park and Thurman Aves., $6,530.

Ralston, Neb.—Stretch of road four blocks long from railway station to paved road will be paved and contract has been let to Ledler & Co. of South Omaha, bonds of $5,000 having been issued by Ralston citizens.

Camden, N. J.—In awarding of contracts for asphalt and essential materials for laying on street, City Council's Street Committee has saved something like $5.55 per ton on raw material. Other ingredients were purchased at correspondingly low rates. The Warner, Quinlan Company, of New York, was given contract for furnishing raw asphalt at rate of $15.45 a ton. The Camden Lime Company and Justice & Company were given contract for furnishing Portland cement at $1.62 per barrel, while Norcross & Edmunds were awarded contract for sand at 65 cents a ton. Other materials were purchased at reasonable figures.

Lumberton, N. J.—For construction of three miles of shell road in Lumberton by Lumberton Township Commissioners to Thos. J. McGovern, of Trenton, at $8,651.

Newark, N. J.—Four contracts for paving streets with asphalt on six-inch concrete foundation have been awarded to Continental Public Works Co. Bidder's figure was $1.96 per sq. yd. The contracts were for paving Warwick St., from Van Buren to Lang St., $6,544.50; Nichols St., from Van Buren to Tyler St., $3,359; Jay St., from Central Ave. to Sussex Ave., $5,385; Ricord St., from West End Ave. to Vermont Ave., $2,776.10.

Albany, N. Y.—By State Highway Department, for building of brick highway from present termination of city pavement of brick for distance of one mile and three-quarters to watering place near George Coleman's property on South road, Poughkeepsie, to Samuel Beskin of Beacon, for $43,523.10. Other bids were as follows: The Bridgeport Construction Co. of Poughkeepsie, $45,-030.50; Catskill Construction Co., $45,-771.95; Schenectady Construction Co., $46,978.50; E. A. Fraser of Poughkeepsie, $47,409; DeGraff & Hogaboom of Kingston, $47,476.75; H. B. Sproul of Peekskill, $47,972.

Albany, N. Y.—Following were low bidders for constructing public highways by State Aid, February 27: Road No. 731-R, J. H. Hurley, Fredonia, N. Y., $55,323.80; No. 436, James Rossney, Buffalo, N. Y., $63,244.75; No. 5443, DeGraffe-Hogeboom, Kingston, N. Y., $149,746.25; No. 5433, J. B. Hurley, Fredonia, N. Y., $42,417.50; No. 5441, Spuyten-Duyvil, New York City, $18,430; No. 1149-50, Ruddy-Saunders Cons. Co., Troy, N. Y., $35,108.50; No. 758-A, H. N. Cowles, Rochester, N. Y., $98,338.37; No. 5442, Semper Bros., Watertown, N. Y., $34,-079.50; No. 5229, Jos. Walker Cons. Co., Albany, N. Y., $70,267.50; No. 5438, Bridgeport Cons. Co., Poughkeepsie, N. Y., $20,993; No. 5439, Spellman-Oliver Co., Chateaugay, N. Y., $38,275.60; No. 1143, William G. Fox, Saratoga Springs, N. Y., $22,476; No. 1155, Stanley Construction Co., Buffalo, $57,894.60; No. 5324-A, John W. Gurnett, Watkins, N. Y., $14,-245.25; No. 127, Jos. Walker Construction Co., Albany, N. Y., $14,470; No. 5218, McGuigan, McGreevey & Co., Elmira, N. Y., $5,893.50; No. 225, Paddleford & King, Sheburne, N. Y., $9,126; No. 891, Theo. C. Hailes, Albany, N. Y., $13,079.95; No. 744, Boynton & McNally, Keeseville, N. Y., $3,426.20; No. 95, DeGraff & Hogeboom, Kingston, N. Y., $39,533.37; No. 250, Harry W. Roberts, Utica, N. Y., $38,720.50; No. 314, Hollington Co., Troy, N. Y., $27,-646.32; No. 5116, W. T. Thayer, Chateaugay, N. Y., $2,531.30; No. 878, Burns & McConville, Ogdensburg, N. Y., $7,037.70; No. 5026, Peter F. Connolly, Waverly, N. Y., $7,239; No. 5168, T. H. Gill, Great Bend, N. Y., $3,091; No. 483, John H. Goron, Albany, N. Y., $5,225; No. 228, Henry J. McNamee, Eddyville, N. Y., $13,131.13; No. 418, Wm. G. Fox, Saratoga Springs, N. Y., $11,375.50; No. 417, Jos. Walker Construction Co., Albany, N. Y., $6,918; No. 97, Flood & Van Wirt, Hudson Falls, N. Y., $8,004.20; No. 5429, P. F. Connolly, Waverly, N. Y., $10,604.50.

Watertown, N. Y.—President of board of public works has been authorized to enter into contract with Standard Oil Company for oiling 180,000 sq. yds. of roadway at cost of 1.6 cents a yd. Work is to be done about June 1. No. 5 oil is to be used.

Charlotte, N. C.—For cement sidewalks as follows: To Blankenship & McClelland, of Ft. Mill, S. C., for 12,000 sq. yds., 97½ cts.; and to J. W. Haas, of Charlotte, for 15,000 sq. yds., $1. A. H. Wearn is City Clk.

Cincinnati, O.—By County Board Commissioners to Van Camp Bros., Newtonville, at $16,658, for improving Wooster Pike from Bamford Hills to Miami River bridge, at Milford, Columbia Township.

Findlay, O.—County commissioners have contracts for 15 miles of water bound pike as follows: Claude Dutton, of Bowling Green, the Treece road, four miles in Amanda township, for $16,800; A. W. McNeal & Son, Findlay, the Essinger road, 1¼ miles long, for $8,000, and the Eagle Center road, 1¾ miles long, for $8,085; C. D. Finch, of Bowling Green, gets the South Ridge road, four miles long, for $15,000, while the Pepple road goes to C. T. Biggs ,of Findlay, for $5,000. It is 2¼ miles long. County highway map, prepared by Engineer Taylor, shows 1,152 miles of roads in Hancock county, one-half of them improved. About 50 miles of improved roads will be built here this year.

Youngstown, O.—For construction of macadam road in Boardman Township, to I. W. Coy, at $7,680.

Salem, Ore.—For construction of 9½-mile Central Oregon Highway to Akeson & Bloomquist, at $32,000.

St. Johns, Ore.—For hard surfacing and construction of concrete sidewalks on Williamette Blvd., by City Council, to V. W. Mason, at $17,000.

Beaver, Pa.—At a meeting of Patterson Heights council bids for paving of Incline road from Beaver Falls borough line to top of hill were received. Bidders and amount bid was as follows: R. C. McQuiston, of Farrell, Pa., $6,115; George S. McFall, Beaver Falls, $6,315; W. S. Morrison, New Brighton, $6,435; J. G. McGuire & Co., New Brighton, $6,-625, and four other bids ranged to $8,000. Contract will be awarded to lowest bidder.

Meadville, Pa.—For brick paving, all of Jamestown brick on 5-in. concrete base, concrete curb and gutter: To Harris Constr. Co., Meadville, Contract A, 22,-026 sq. yds., and also Contract B, 20,290 sq. yds., at $1.98 per sq. yd., total cost, including curb, etc., about $110,719; to Lawrence Schultze, Fredonia, N. Y., for Contract C, 12,274 sq. yds., at $1.86 per sq. yd., total cost about $30,569; and to Thos. McGuigan, Meadville, for 7,095 sq. yds. at $1.98 per sq. yd., total cost about $20,557. B. F. Miller is City Engr.

Philadelphia, Pa.—Patchwork repairs to asphalt streets to value of $250,000 have been authorized when Chief Connell awarded contract for this amount to the Union Paving Co.

Belton, Tex.—For improvement of roads in Bartlett district, good roads district No. 2 of Bell county to Edward Howard, of Belton.

Fort Worth, Tex.—Contracts for grading and graveling two more stretches of Tarrant county's good road system have been let by County Commissioners. One of these was portion of road between Crowley and Cleburne, and this contract was awarded to G. T. Young, the price being $1,558.96. Other was between Grapevine and Roanoke and was awarded to Wright & Winfrey for $631.20.

Sioux Falls, S. D.—To C. H. Atkinson Paving Co. of Watertown, for paving Prairie Ave., at following bid: 15,000 sq. yds. asphaltic concrete pavement, $1.51 per sq. yd.; grading, 8.7 cts. and stone headers, 3.4 cts.; total, $1.631 per sq. yd. Other bidders on this class of pavement: Handon & Okes, Sioux City, Ia., $1.71; Fielding & Shepley, Minneapolis, Minn., $1.92, and Lincoln Constr. Co., Lincoln, Neb., $2. S. B. Howe is City Engr.

El Paso, Tex.—Contract made by mayor with Texas Bitulithic company for paving Bliss St., from Piedras to Stevens, has been approved. Street is to be paved with light bitulithic paving. Contract price is $1.46 per sq. yd. Paving company agreed to furnish an $8,000 bond for its performance of contract.

Fort Worth, Tex.—County Commissioners have accepted bid of G. T. Young for constructing one-fourth mile of Arlington Webb road for $617.50.

Fort Worth, Tex.—For paving various streets with brick to General Construction Co., Fort Worth, at $52,000.

Houston, Tex.—The Houston Concrete Co. has been awarded contract in competitive bidding this week on 48,000 sq. ft. of sidewalk to be put down in Central Park.

Houston, Tex.—Bid of E. J. Overly for paving Houston Ave., from White Oak Bayou to the city limits, has been accepted, contract price $33,000. Also for paving Hamilton St., from Franklin to Runnels Aves., $42,000.

Everett, Wash.—Bids have been opened for constructing the Arlington-Darrington road from Boulder Creek to east line of Township 32-8, as follows: John Leatherdale, $15,989.78; Drooping & Broe, $11,575.37; Reinseth Bros., $8,896.89; Ellis Bancroft, $8,027.24. On motion bid of Ellis Bancroft was accepted.

Milwaukee, Wis.—By Department of Public Works for furnishing 12,000 bbls. of portland cement to Western Cement Co., at $15,300. F. G. Simons is Comr.

Milwaukee, Wis.—For paving with asphalt on Murray Ave., 25th Ave., Locust and Prairie Sts., to White & Badger Constr. Co., at $1.75 per sq. yd.

Port Arthur, Ont.—For constructing a macadam road on Algoma St., requiring 37,000 sq. yds., to Hugh Wray, of Port Arthur.

SEWERAGE

Birmingham, Ala.—Ordinance has been adopted for construction of sanitary sewers.

Gadsden, Ala.—Election has been authorized for voting on $30,000 in bonds for sewerage.

Pasadena, Cal.—City is discussing adequate storm drain system.

Vallejo, Cal.—Sum of $142,000 has been voted for sewer and harbor improvements.

Waycross, Ga.—Plans are being considered for extension of present drainage system.

La Porte, Ind.—City Engineer Goddard and assistants are now working on specifications for extension of Lincoln avenue sewer, which will connect with Three-Way Prison Company plant. Laterals will be built and practically entire factory district will be sewered by extension. Fifteen and 18 inch pipe will be used.

Vincennes, Ind.—City Engineer Harry T. Watts has completed plans and specifications for system of storm water sewers proposed for this city.

Clinton, Mass.—Town will vote on question to raise and appropriate sum of $8,000 for purpose of sewer construction.

Flint, Mich.—Common Council has passed resolution unanimously to give taxpayers of Flint opportunity to vote at election on April 6 on proposition to bond city for $178,238.02 to pay for cost of storm water sewers to be built under plan outlined more than a year ago.

Kalamazoo, Mich.—About one mile of sewers will be constructed.

Saginaw, Mich.—It is estimated by R. L. Johnson, Commissioner of Water, Light and Sewers, that 1914 new sewer campaign will involve expenditure of between $30,000 and $40,000 about similar to what was done preceding season.

Poplar Bluff, Mo.—Sanitary sewers will be constructed in Sewer District No. 4. About 27,000 ft. of vitrified sewer pipe, from 18 in. to 6 in., and one disposal plant. Estimated cost, $25,756. Edward C. Thomas is city engineer.

St. Joseph, Mo.—Ordinance is being considered providing for Construction of Sewers in portion of Sewer District No. 116, located in Beattie st., from 17th to 18th sts., in the east and west alley between Beattie and Holman sts., from 18th to 19th sts., and in the north and south alley between 19th and 20th sts., from Highly st. to the east and west alley first south of Hghly st.

Brunswick, Neb.—Citizens will vote on bond issue of $12,000 Feb. 27, to be used, if they carry, for purpose of installing modern water system.

Stanton, Neb.—City will vote on installation of sewer system to cost about $8,000.

Asbury Park, N. J.—Mayor William A. Berry has returned to City Clerk S. Hellner Calvert contracts with W. K. Fenn, trading as W. K. Fenn & Co., for construction of sewer outlet from septic tank 1,200 ft. to sea together with his veto.

Newark, N. J.—Votes taken at informal meeting of Orange Common Council indicate that majority will favor immediate action to unite with Montclair and East Orange in erection of joint sewage disposal plant at Belleville.

Swesboro, N. J.—Engineer Clyde Potts, 30 Church St., New York, is making plans for proposed sewer system.

Albany, N. Y.—Conservation Commission has approved application of city of Watertown to discharge sewage from proposed sewer extension in Hewitt St. into Black river through western outfall sanitary trunk sewer.

Binghamton, N. Y.—Ordinances have been adopted for construction of various sewers.

Ellicottville, N. Y.—Chairman C. M. Walrath of village board of health has received recommendation from State Department of Health for installation of sewer system throughout village. This step has been taken as result of survey and investigation made by State officials of water supply and sanitary conditions. Cost of such system has been estimated at about $50,000.

Rochester, N. Y.—Consulting Engineer Edwin A. Fisher has received request from State Health Commission for detailed plans for the Brighton sewage disposal plant, in connection with sewage disposal system of city. Brighton plant will be located just north of line between Irendequoit and Brighton on a farm of 22 acres, which was purchased for purpose. Estimated cost of system, $80,000.

Utica, N. Y.—Ordinances recently adopted by Common Council, directing city engineer to prepare plans and specifications for sewers in Holland Ave. from end of present sewer to Prospect St., and in Margaret St., from Holland Ave. to western end of the street, have been received by Board of Contract and Supply.

Davidson, N. C.—Town is still agitating question of bond issue for complete sewer system in connection with partial one of college. At next regular meeting matter will be determined. Estimate of cost varies from $15,000 to $20,000.

Hendersonville, N. C.—Preparations are being made by city officials to lay 10,000-foot pipe line so as to furnish city additional 100,000 gallons of water a day. One of 6,000-foot lines emptying into reservoir will be extended so as to receive contents of stream finding its source in vicinity of Jump Off Mountain. Line will cost about $1,200.

Cincinnati, O.—Plans are being considered for improvements to city water service.

Dayton, O.—Bids will be received at office of city accountant until 12 noon, March 30, for sale of bonds in sum of $33,500 for construction of storm water sewers in various streets. H. E. Wall is City Accountant.

Youngstown, O.—As result of meeting at Pleasant Grove between residents of community and county officials, it was decided to proceed with erection of sewage disposal plant to take care of greater part of north half of Boardman Township. County Commissioners will prepare necessary legislation and when preliminary steps are taken, work will be pushed forward rapidly.

Washington, O.—Resolution has been adopted declaring it necessary to construct, maintain and operate main sanitary sewer No. 7, in sub-district No. 1 of Lucus county, Ohio, main sewer district No. 2, in Washington township.

Erie, Pa.—Mayor Stern has announced to council that question of experimental sewerage disposal plant will have to be taken care of when annual budget for coming financial year is prepared within next few months.

Johnstown, Pa.—Clark P. Collins, Sanitary Engineer in charge of making of preliminary plans for sewage disposal plant and modern sewer system, will shortly submit a report to Superintendent of Highways H. H. Grazier.

Reading, Pa.—Reading is about to construct $300,000 worth of storm sewers.

Wilkes Barre, Pa.—Department of streets has obtained permission from Pennsylvania railroad to run surface drain under company's tracks to Solomon's Creek, which drain is to be used to carry off surface water from Carlisle, Sturdevant, Cedar, Stark and other streets in lower section of city.

Providence, R. I.—New draft to charter for Edgewood Sewer District has been accepted by meeting of taxpayers of district and will be submitted first to General Assembly for enactment, and to voters of district for final adoption on May 15. Amount of money district will be authorized to borrow is placed at $300,000 instead of $160,000.

Providence, R. I.—City Council has approved of reports of finance committee for bond issue of $350,000 for sewers.

Austin, Tex.—Enormous storm sewer, costing between $25,000 and $30,000, may be built in Sabine St. from Third to Second St. to carry off flood waters of Waller Creek.

Temple, Tex.—Improvements to cost $40,000 will be made at once to sewer plant, which includes new septic tank and extensions of larger pipe.

Wharton, Tex.—Contracts for construction of sewerage along Fulton st. leading from court house square to the Santa Fe depot have been ordered advertised, these to be let to lowest bidder.

Salt Lake City, Utah.—Bond issue of $270,000 has been voted for construction of main outlet sewer, 18,000 ft. long, 7 ft. in diameter.

Charleston, W. Va.—People will vote shortly on bond issue for following sewer work: 500 ft. of 72-in. sewer (brick or segment block); 2,000 ft. of 60-in.; 1,300 ft. of 54-in.; 3,500 ft. of 48-in.; 4,400 ft. of 36-in.; 1,000 ft. of 30-in.; 4,400 ft. of 24-in. sewer (terra cotta); 1,600 ft. of 20-in.; 400 ft. of 18-in.; 1,400 ft. of 15-in.; 6,600 ft. of 12-in.; 3,300 ft. of 10-in.; and 3,400 ft. of 8-in.; 75 brick manholes; 100 brick catch basins and 3 concrete sewer outlets.

Seattle, Wash.—Plans have been approved for construction of sewers on Fourteenth Ave., N. W.

Milwaukee, Wis.—New sewers to cost $51,000 have been recommended by sewerage committee of Common Council. A main lead to cost $35,000 is recommended for Hawley road from Menomonee River to Vliet St. and brick sewer to cost $16,000 is recommended as continuation of Locust St. main to extend from Humboldt Ave. to North Pierce St.

Racine, Wis.—Resolutions have been adopted for construction of various sewers.

Port Arthur, Ont.—City has petitioned Provincial Government for approval of issue of $800,000 for sewage disposal.

Edmonton, Alta.—Sum of about $2,164,000 may be spent this year for sewer extensions.

CONTRACTS AWARDED.

Opp, Ala.—To McCrary Co., of Atlanta, Ga., for construction of sanitary sewer system.

Tempe, Ariz.—By Common Council, for construction of sewer system to, Doyle Bros., of Tucson, at $32,050, for sewer complete, with vitrified pipe.

Boulder, Colo.—Council upon recommendation of street committee has awarded contract to M. F. Chamberlain for construction of concrete ditch over Anderson Ditch Company between College and Pennsylvania Aves. on Thirteenth St. for $824.

Tampa, Fla.—By Board Comrs. Pub. Works, for constructing sewers and appurtenances, Secs. 1 to 10, as follows: To Sullivan Greason, Tampa, Sec. 1, $58,800; Sec. 2, $17,900; Sec. 3, $28,413; Sec. 5, $120,729; Sec. 10, $41,799. To Edwards Constr. Co., Tampa, Sec. 4, $33,500. To McNeil, Davis & Webb, Tampa, Sec. 6, $110,724; Sec. 7, $81,167; Sec. 8, $136,752; Sec. 9, $31,433. Work includes 45 miles of 8 to 26-in. sewers, including Imhoff tanks, pumping station, etc. Engineers are Twombly & Henney, 55 Liberty St., New York.

Jackson, Ga.—To Sullivan, Long & Haggerty, of Bessemer, Ala., for constructing sewer system, from plans of J. B. McCrary Co., of Atlanta. Cost, $13,402. W. E. Merck is Supt. Water and Light.

Mt. Vernon, Ill.—For constructing 3 miles of 8-in. clay pipe sewer, to Jerome Mannen of Mt. Vernon, at $5,440. Other bidders: J. T. Collins, Mt. Vernon, $5,579; Leonard Heirsch, St. Louis, Mo., $6,000; Shockley & Hall., Mt. Vernon, $5,478; D. E. Nipp, Flora, Ill., $6,477; A. C. Schreiter, Manitowoc, Wis., $6,145; and Mitchell & Coogan, Lincoln, $5,968.

Grinnell, Ia.—For construction of system of sanitary sewers in West Grinnell to Black Hawk Constr. Co., of Waterloo. Estimated cost, $100,000.

Ottawa, Kan.—Contract for constructing sewer lateral No. 61, on West Fifth St., distance of 1,320 ft., has been awarded to C. W. Barnett by City Commission. There were three—Elder Mercantile Co., $935.32; Seevers & Son, $905; C. W. Barnett, $899.

Salina, Kan.—To Leonard C. Ahart contract for construction of storm sewer on Walnut St. by city council. Ahart was lowest bidder on practically all features of sewer except on few minor items. He will receive 43½ cents per lin. ft. for the main sewer, which is approximately 1,740 ft. long; 40 cents per lin. ft. for 350 ft. of sewer from manholes to main line; $24 each for six manholes; $7 each for brickwork and $7 for cast iron top for catch basins and 50 cents each for closing ends.

New Bedford, Mass.—For two boilers for screen station of intercepting sewer system to P. F. Wood Co., of New Bedford, at $3,844.

Saugus, Mass.—Bids on 30 carloads of sewer pipe from 4 to 24 inches have been opened in office of purchasing agent. There were 14 bidders and two lowest were Lynn men. Contract was awarded to W. C. Whittredge & Co., whose bid was 1-10 of a cent lower than People's Coal Co.

Newark, N. J.—At meeting of Passaic Valley Sewerage Commission contract for construction of outfall pressure tunnel from point near the Robbins reef lighthouse under New York Bay, to Jersey shore, thence through private lands and Thompson Ave., Jersey City, to a point about 200 ft. northwest of old Bergen Road, has been awarded to O'Rourke Engineering & Construction Co., of New York. Contract price for tunnel is $1,796,900.

Woodbridge, N. J.—Contract for sewer to be laid in Greenbaum tract has been awarded to Monmouth Contracting Co. for $3,626.49.

Fairport, N. Y.—By Village Trustees, for constructing sewers and disposal plant as follows:

To Bishop Const. Co., of Rochester, for constructing intercepting sewer as follows: 850 cu. yds. earth excav., 33 cts.; 50 cu. yds. earth embankment, 53 cts.; 214 cu. yds. concrete, Class A, $10; 19 cu. yds. concrete, Class B, $5.50; 19,000 lbs. steel reinforcement, 2½ cts.; 353 ft. 18-in. c. i. pipe sewer, $5; 102 ft. 8-in., $1.05; 13,400 lbs. c. i. specials, 4½ cts.; 450 ft. 2-in. wrought iron pipe, 50 cts.; 135 ft. 1-in. lead pipe, 60 cts.; 309 ft. 18-in. vitr. pipe sewer, $1; 525 ft. 8-in., 57 cts.; 65 ft. 6-in. 32 cts.; 384 ft. 4-in. drain, 25 cts.; 3 branches on 8-in. vitr. pipe, 75 cts.; 7 manholes under 8 ft., $40; lumber, $60 per M ft.; 80 cu. yd. gravel and sand, screened, $3; total, $6,381.

To John Petrossi Co., of Rochester, for sewage disposal plant, as follows: 5,800 cu. yds. earth excav., 50 cts.; 100 cu. yds. rock excav., $3; 6,931 ft. 18 to 6-in. vitr. pipe sewer, 70 cts. to 25 cts.; 1,087 ft. 18 to 6-in. c. i. pipe, $2.24 to 62 cts.; branches on vitr. pipe, $1.25 to 75 cts.; 2,900 lbs. flanged specials, 3½ cts.; 160 cu. yds. special earth excav., $1; 5 M. ft. lumber left in place, $25; 43 cu. yds. concrete, Class A, $12; 260 cu. yds. concrete, Class B, $4; 1,000 lbs. steel reinforcements, 5 cts.; railway crossings, $3,500; total, $11,010.

Totals of other bids received on (a) intercepting sewer; (b) sewage disposal plant: A. J. Shaw, Jr., Batavia, (a) $11,961, (b) $6,879; Nicola Desiderio, Rochester, (a) $13,269, (b) $6,677; R. W. Relly, Saranac Lake, (a) $14,000; Bishop Constr. Co., Rochester, (a) $14,059; Bruno Pizzimenti, Seneca alls, (a) $14,846, (b) $8,852; rontier Constr. Co., Buffalo, (a) $15,607, (b) $7,257; E. W. Walsh, Elmira, (a) $15,684; C. T. Hookway, Syracuse, (a) $16,198, (b) $7,243; New York Sewage Disposal Co., New York, (a) $16,887, (b) $8,097; Wm. H. Sours, Rochester, (a) $18,490; Frank Costurer, Rochester, (a) $20,407, (b) $7,853; Brodisi Pasquale, East Rochester, (a) $24,640, (b) $10,476;

Drake & Deane, Inc., Buffalo, (b) $7,900; W. A. Lofler, Rochester, (b) $7,873; J. D. Tuller, Auburn, (a) $7,655; E. B. Strawger, Pittsford, N. Y., (b) $6,814; L. J. arrell, Rochester, (b) $6,623. C. F. Fisher is Village Engr.

Mt. Vernon, N. Y.—By Board of Public Service contract to W. H. Ralston, city, at $14,700, for constructing sewage disposal plant.

Waterloo, N. Y.—By village, to Drake & Dean Co., Inc., Buffalo, N. Y., at following bid: 1,400 cu. yds. earth excav., north side, at $2.50, total $3,500; 250 cu. yds. earth excav., south side, $2.50, total $625; 370 cu. yds. concrete C. I. A., $14.80, total $5,476; 20 cu. yds. concrete C. I. B., $10.90, total $218; 11 tons steel reinforcement, $70, total $770; 2 tons screen chambers, $82.50, total $165; lead pressure pipe, $160.90; stop planks and stop boards, $44.30; 4 sludge pipes $31,26, total $125.04; 5 sludge wells, $63.44, total $317.20; 4 8-in. gate valves, $22.60, total, $90.40; 200 4-in. water pipe, 81 cts., total $162; 1 4-in. gate valve, $12.20; 2 sludge beds, $150, total $300; 128 lin. ft. 20-in. sewer, $1.14, total $145.92; 215 lin. ft. 15-in. sewer, $1.02, total, $219.30; 180 lin. ft. 8-in. sewer, 44 cts., total $79.20; 1 yard hydrant, $45; grand total $12,455.46. Morrison & Farmington, Inc., and Chas S. Bowman, Engrs., Syracuse, N. Y.

Salt Lake City, Utah.—Contract to construct a 4x5 ft. concrete storm sewer conduit on Ninth South between State and West Temple and from Seventh West to Jordan river has been awarded to Ryberg Bros. on low bid of $15,295.10.

WATER SUPPLY

Cullman, Ala.—J. B. McCrary & Co., of Atlanta, Ga., are preparing plans for water works, to cost about $30,000.

Gadsden, Ala.—Question of supplying water for Alabama City is being discussed.

Douglas, Ariz.—City water commission has authorized advertisement for bids on construction of new 14-inch main from F Ave. mains to pump house, about two miles west of Douglas.

Yreka, Cal.—Street Superintendent Edgar Thomas has submitted to Board of Trustees estimate of cost of laying 4,335 ft. of water mains on Main St., his estimate being $3,601.60.

Muscatine, Ia.—The Muscatine and Louisa County Supervisors are debating question of advisability of entering into contract with McDonald Engineering Co. of Chicago for construction of No. 13 district pumping station.

Mt. Pleasant, Ia.—Mount Pleasant City Council will advertise for bids shortly for extensive improvements of municipal water works, which are to give Mount Pleasant sufficient and adequate fire protection. Plans called for reinforced concrete reservoir capable of holding 200,000 gals. of water for emergency purposes, which will be built on land recently purchased by city near present holdings. Reservoir will be 16 ft. deep and 56 ft. in diameter. Steam pump with capacity of 1,000 gals. of water a minute will be installed. This pump will force water into three lines of hose at any pressure desired for period of three hours. Additional fire plugs will be installed, and all old water mains will be replaced by new 10-in. mains, while several blocks of new mains will be added. Four 10-in. mains will lead from pumping station to business district.

Nevada, Ia.—Reservoir site has been purchased.

Portland, Me.—Charles H. Gilman & Co. of this city and Old Colony Trust Company of Boston on their joint bid of 102.09 have been awarded issue of $100,000 of 4 per cent. 20-year bonds of Portland Water District.

Rockville, Md.—Question of pure water supply for city is being discussed.

Saugus, Mass.—Town will vote on approval of water commissioners to make a water loan of $15,000 for purpose of extending and improving water system.

Muskegon, Mich.—Plans prepared by W. J. Sherman Engineering Co. of Toledo, O., for proposed water system are being considered.

Saginaw, Mich.—Resolution is being considered calling election in May for voting on buildng of new water plant to cost $700,000.

Duluth, Minn.—Ordinance appropriating $2,000 for water main in Railroad St. has been passed.

Duluth, Minn.—Ordinance appropriating $35,500 for materials for water and light department has been given its second reading.

Clyde, Mont.—Election may shortly be held to vote on $16,500 bond issue for water works.

Asbury Park, N. J.—Sewer and Water Chairman Hancock's resolution for $50,000 water bond issue for new equipment and repairs at the pumping plant and a new 24-inch forcing main from pumping plant to Second Ave. reservoir has been unanimously adopted by council and City Clerk S. Heilner Calvert instructed to proceed with advertising of intention.

Ogdensburg, N. Y.—At meeting of common council annual reports of water board and board of public works were adopted. Recommendation of water board that $30,000 in water bonds bearing 4½ per cent be issued was carried.

Durham, N. C.—Board of Aldermen has called bond election on purchase of water works for April 21, and have also ordered that new registration be held for this election, at which it is purposed to vote $500,000.

Gastonia, N. C.—See Miscellaneous.

Akron, O.—Bids have been opened at office of Board of Control at City Hall for pipe, valve and hydrants, to be used in city water department, estimated cost of which runs close to $70,000. Pipe to be contracted for is to be used in extensions to water system, and some of larger pipe in reinforcing of present lines. Approximate quantities in various contracts are as follows: Cast iron pipe—3-in. pipe, one ton; 4-in. pipe, two classes, 20 tons; 6-in. pipe, three classes, 1,061 tons: 8-in. pipe, two classes, 235 tons; 10-in. pipe, two classes, 181 tons; 12-in. pipe, two classes, two tons; 30-in. pipe, two classes, 1,130 tons; plan specials, two tons; standard specials, 75 tons; total, 2,707 tons. Hydrants—150 required, to be added to the number now installed in the city, the department having installed 266 hydrants during the last two years. Gate valves, valve boxes, and check valves—two 3-in. gate valves; five 4-in. gate valves; 200 6-in. gate valves, twelve 8-in. gate valves; eight 10-in. gate valves; one 12-in. gate valve; two 16-in. gate valves; five 24-in. gate valves; 260 valve boxes; two 4-in. check valves. Bids received were as follows: On cast iron pipe and specials, three bids received: United States Cast Iron Pipe & Foundry Co., $59,946.50; R. D. Wood & Co., $69,359; Massillon Iron & Steel Co., $60,816. Gate Valves, valve boxes, check valves, six bids received: Rensselaer Valve Co., $3,865.70; Chapman Valve Manufacturing Co., $3,840.04; Roe-Stephens Manufacturing Co., $3,853; Coffin Valve Co., $3,663.40; Darling Pump & Manufacturing Co., $4,116.75; Ludlow Valve Manufacturing Co., $3,759.35, exclusive of vale boxes. Fire hydrants, 150 required, six bids received, three from the Ludlow Valve Manufacturing Co., on various specifications; Darling Pump & Manufacturing Co., $4,200; Rensselaer Valve Co., $4,200; Coffin Valve Co., $2,992.50; Ludlow Valve Manufacturing Co., $3,967.50; Ludlow Valve Manufacturing Co., $4,162.50; Ludlow Valve Manufacturing Co., $4,462.50.

Hamilton, O.—Ordinance has been passed authorizing the issuing of $10,000 of 4½ bonds to extend water mains and $50,000 to complete flood rehabilitation.

Youngstown, O.—Bonds in sum of $250,000 for city water works extension have been awarded to Farson Son & Co. of Chicago.

Buffalo, Okla.—Citizens have voted to issue $45,000 bonds for water works improvements.

Baker, Ore.—Water bonds in sum of $98,851 have been awarded to E. H. Rollins & Co., of Denver.

Chester, Pa.—By State of Pennsylvania to Smith Smith, sanitary engineer of borough, contract to put in nearly 500 ft. of water main through state quarantine property in borough.

Providence, R. I.—Common council of this city is considering report of special committee on increased water supply, relative to proposed gigantic addition to city's water supply system. Creation of monster water shed more than 200 miles in area, construction of huge storage reservoir or reservoirs in the village of Kent, and building of aqueducts from reservoir to Sockanosset reservoir through which water will flow by gravity, are some of things which committee recommends. Exact figures on cost of proposed project, report states, are not yet available, but estimate of expenditure necessary is between $8,000,000 and $9,000,000. Watershed area from which water will be taken under plan includes all of township of Scituate and portions of townships of Foster, Glocester, Coventry, West Greenwich and Cranston.

Providence, R. I.—Both branches of city council have passed resolution authorizing city solicitor to apply to general assembly for passage of necessary legislation to provide for additional water supply for city of Providence. Resolution passed without word of discussion in either branch.

Fort Mill, S. C.—Petition circulated among Freeholders of Fort Mill asking for election to vote on propesd bond issue for water works has been completed, and City Council will at its next regular meeting order election.

Austin, Tex.—Attorney General's department has approved issue of $18,000 city or Rusk water works bonds.

Galveston, Tex.—Board has decided to employ services of John B. Hawley, hydraulic engineer from Fort Worth, to make investigation of wells and conditions at Alta Loma with view of making suggestions as to what would be best to do in order to increase water supply of city.

San Antonio, Tex.—Proposed contract between city and San Antonio Water Supply Company has passed city council on first reading.

Temple, Tex.—Improvements to cost $10,000 will be made at once to city water works.

Salt Lake City, Utah.—Following are bond issue improvements to be made this year to water works system: Thirteenth South supply mains, $100,000; Ninth East and other distribution mains, $27,000; Twin Lakes reservoir and dam, $75,000; additional work on Phoebe-Mary reservoir, $20,000; East Bench distribution reservoir, $33,000; total, $255,000.

Norfolk, Va.—Construction of water main in Lindenwood is recommended; estimated cost $3,000.

Wittenberg, Wis.—By majority of twenty-six, local voters have approved issue of $30,000 of village bonds for putting in municipal system of water works and sewers.

Le Paz, Man.—Engineers Murphy & Underwood of Saskatoon, Sask., are making plans for proposed water works and sewer system. H. H. Ellicott is City Secy.-Treas.

COOTRACTS AWARDED.

Manhattan Beach, Cal.—For constructing municipal water works, to Municipal & Industrial Equipment Co., Story Bldg., Los Angeles, at $92,673. Work includes 109,790 ft. of 2 to 12-in. pipe, gater valves, 103 two-stream and 17 one-stream fire hydrants, frame pump house, one 315-g.p.m. direct connected well pump, one 800 g.p.m. direct connected pressure pump, 10 ft. x 71 ft. x 178 ft. reinforced concrete reservoir, a steel storage tank, 300 metered house connections.

Bloomington, Ill.—By Water Board, contract for new city well to be sunk on Harwood lot, about 600 ft. southeast of well No. 3, which is on hill northwest of water works. There were two bidders, Samuel Johnson, of Normal, bidding $1,450, and S. B. Geiger, $1,250. Latter was awarded the contract.

Deerfield, Ill.—By Village Board of Trustees contract to W. G. Hoye, Woodstock, Ill., at $11,600, for constructing system of water works. E. A. Rossiter is Village Engr.

Eagle Grove, Ia.—For constructing well, 16 ft. diameter inside and about 60 ft. deep, to Kist & Boring of Eagle Grove, at $4,040. Other bidders: D. Wolff, St. Paul, $5,900; W. D. Lovell, St. Paul, $5,450; Tanner Bros., St. Paul, $5,950; and Wilis-Shaw Machinery Co., Chicago, $6,900.

Beverly, Mass.—Contracts for water department supplies have been awarded at meeting of commissioners. Low bidders were given contracts in all of contracts awarded. For cast-iron bell and spigot water pipe contract was awarded to R. D. Wood Co., of Philadelphia, for $7,019.30. Builders Iron Foundry of Providence, was given contract for special castings at $644.12. Chapman Valve Co. was given contract for hydrants at $672, while order for main gate valves went to Coffin Valve Co., of Neponset, at $359.35. For supplying pig lead Chadwick-Boston Lead Co. was given contract at $865, while same company was given order for lead pipe at $116.97. The Chapman Valve Co. was given order for drip valves and small gate valves at $89.30. Wrought iron pipe and fitting order went to Boston Pipe & Fitting Co., for $883.32. Eagle Oil & Supply Co. was given order for supplies for pumping station, the bid footing up to $423.

Allegan, Mich.—For 3,806 ft. water main, to Grand Rapids Hydraulic Co. of Grand Rapids.

Negaunee, Mich. — To Worthington Meter Co. of Harrison, N. J., for furnishing of 200 water meters.

Duluth, Minn.—The United States Cast Iron Pipe & Foundry Co., of New York, was successful bidder for pipe business of Water and Light Department. Bids were secured on estimated quantity of pipe which will be used in extensions during season of 1914. Total was 1,260 tons and bid was $30,472.50.

Mountain Iron, Minn.—Village council has awarded contract for furnishing a 14x8x12 steam pump to Platt Iron Works of Dayton, Ohio, for $660, through J. F. Gould of Minneapolis. There were a number of bids, as follows, name of bidder, size of pump and price being given: Advance Pump & Compression Co., 14x7x12, $400; Dwyer-Field Co., 14x7x14, $575; Worthington Co., 14x7x12, $384; Worthington Co., 14x 8½x12, $585; Whitacre & Co., 14x7x12, $447; Prescott Co., 14x7x12, $800; Marshall-Wells Co., 14x7x12, $560; Fairbanks-Morse Co., 14x7x12, $417.50; Platt Iron Works, 14x7x12, $585; Platt Iron Works, 14x8x12, $660.

Wabasha, Minn.—By City Council, contract to Kersher Bros., St. Paul, Minn., for 500,000 gal. reinforced concrete reservoir at $6,500.

Columbus, Mont.—For constructing municipal water works to McLaughlin & O'Neil, of Livingston. Work consists of c. i. distributing system with 8-in. steel ppe from reservoir to city limits, and filter bed. H. L. Havens s City Engr.

Newark, N. J.—By Board of Street and Water Comrs., to Camden Iron Works of Philadelphia, Pa., for coated c.-i. water pipe and special castings, f. o. b. cars Newark, at total of $93,600. It will include 843 tons 4 to 12-in., 1,179 tons 16 to 24-in., 2,516 tons 30 to 36-in. pipe; 65 tons of ordinary specials 4 to 24-in., and 50 tons 30 to 36-in.; all to be 2,000 lbs. Totals of other bids: U. S. Cast Iron Pipe & Fdry. Co., $95,451; Standard Cast Iron Pipe & Fdry. Co., $95,604; Warren Fdry. & Machine Co., $97,218; and John Fox & Co., $97,460.

Albany, N. Y.—To R. D. Wood & Co. of Philadelphia, Pa., for cast-iron pipe, at bid of $21.90 per ton.

Brooklyn, N. Y.—Contract for laying 36-inch main under Narrows, from Seventy-ninth St., Broklyn, to Arietta St. and Stuyvesant Pl., Tompkinsville, Staten Island, has ben awarded to Merritt & Chapman Derrick and Wrecking Company, at $996,862. There were twelve bidders, and highest was $1,685,940. There is a little less than two miles to be laid. Pipe will be laid in trough channeled under Narrows.

New York, N. Y.—To Coffin Valve Co. of Boston, Mass., at $8,600, for Contract 104, for furnishing, delivering and installing gate and other valves, sluice gates and appurtenances along Catskill aqueduct, mainly within New York City

Wheeling, W. Va.—To James Kinney, Jr., of Bellaire, O., at $1.20 per ft., and E. T. Riggs of Moundsville, W. Va., at $1.19 per ft. for drilling and equipping of 30 water wells.
limits.

Seattle, Wash.—For supplying 7,000 ft. of 2-in. and 6-in. galvanized pipe to Crane Company, at $1,834.70.

Lake Geneva, Wis.—By Water and Light Comn., to Cement Stone & Brick Co. of Lake Geneva, for constructing reservoir.

LIGHTING AND POWER

Mineral Springs, Ark.—City is contemplating establishment of electric light plant. E. K. Walden is City Attorney.

Micanopy, Fla.—Citizens have voted to issue $10,000 bonds for installation of municipal electric light plant.

Decatur, Ga.—A "white way" around court house square in Decatur has been approved by city council of that town and bids asked for work. These will be submitted to light committee of council, and will be acted on by council at its next meeting. Estimated cost of proposed improvement is $700. Twelve posts will be erected.

Fort Wayne, Ind.—The Indiana Engineering company, a firm of engineers recently organized, will be given contract for preparing plans and specifications and superintending construction of addition to city lighting plant and installation of new arc lamp machine. Total cost of improvement will be approximately $75,000.

Ottawa, Kan.—It is expected that city council of Quenemo, just across Franklin county line in Osage county, will vote in few days to enter into contract with Marais des Cygnes Power Company to secure electricity from Ottawa plant to light town.

St. John, Kan.—Agitation is in progress for installation of electric light plant.

Lexington, Ky.—Board of City Commissioners is planing the installation of ornamental street lighting system.

Lunenburg, Mass.—Citizens have voted to establish municipal lighting plant and water works system.

Hibbing, Minn.—Extension of white way on Second Ave. past Lincoln school on Fourth Ave. fully as far, and on all of cross streets between Second and Fourth Aves., is contemplated by Water and Light Board this year and it is probable that bids on iron posts and lamps will be asked for soon.

Helena, Mont.—Plans are under consideration for installing street lighting system on west side of town.

Merchantville, N. J.—Public Ser. El. Co. has submitted proposal to Council for installation of new 32-cp and 80-cp street lamps.

Spring Lake, N. J.—Council has opened bids for 25 artistic lighting standards which they contemplate erecting on boardwalk and for underground conduit through which they will run wires. Bids for the standards were as follows: Heaviland & Todd, $25 to $34 each; Gosling & Jahn, $31.90; J. L. Mott Iron Works, $31; Elmer P. Morris Iron Works, $18 to $35; Electric Railroad Equipment Co., $32.57 to $39.84; Ornamental Lighting Pole Co., $27.50 to $30; Casey Hedge Co., $23.60; Dover Boiler Works, $31.90 to $34.50; J. W. Fiske Iron Co., $35; J. W. Bache & Co., $26 to $36.50; George Cutter & Co., $25 to $35.

Bids for conduit were as follows: Heaviland & Todd, $77 per 1,000 lin. ft.; Wyckoff Pipe & Creosoting Co., $67.50; Fibre Conduit Co., $58.90 to $110; American Conduit Co., $45 to $47.50; Clermont Sewer Pipe Co., $35 to $45. All bids were referred to Lighting Committee, which will make selections.

Bath, N. Y.—At coming village election in Bath special tax proposition will be submitted to issue bonds of $50,000 for building and operating electric-lighting plant. It is claimed that suitable lighting plant can be bult for $25,000.

Binghamton, N. Y.—Establishment of municipal electric light plant is urged.

Niagara Falls, N. Y.—Common council has adopted resolution to reintroduce municipal electric light and power bill.

Gastonia, N. C.—See Miscellaneous.

Hickory, N. C.—Erection of gas plant is being considered.

Fremont, O.—Street lighting committee of City Council has decided to relocate number of street lamps and to add more to street lighting system.

Upper Sandusky, Ohio.—City council has passed ordinance authorizing bond issue of $25,000 for construction of municipal electric lighting system.

Catawissa, Pa.—Catawissa Council has ordered special election March 19 to decide whether borough shall sell its lighting plant for $12,000.

Philadelphia, Pa.—Believing that city is paying too much for its electric street lighting service Director Cooke has hit upon his own plan for bringing about a reduction. He has announced that within 10 days proposals will be invited for electric street lighting and for incandescent power for next year. Ostensibly purpose in asking for bids at so early a date, which is radical departure from old system, would be to give competitors opportunity to arrange to provide service if given contract.

Elk Point, S. D.—At a spirited election proposition of bonding city for $25,000 for purpose of erecting electric light plant carried by large majority.

Columbia, Tenn.—Ordinance has passed first reading granting to John H. Carpenter and associates right and privilege of using streets, alleys and roads of city of Columbia for purpose of erecting, maintaining and operating electric light, power and heating system.

Nashville, Tenn.—Board of City Commissioners have approved of plans for doubling output of municipal electric light plant, which will enable Light Department to furnish electricity for commercial purposes. It is proposed to install additional turbo-generating unit at cost of about $35,000.

San Antonio, Tex.—Committees have been appointed and arrangements made to begin at once to raise fund necessary to provide ornamental lighting for Houston St.

Temple, Tex.—Improvements to extent of $50,000 will be made to Temple Gas Light plant in this city. Improvements contemplated include construction of 200,000 cu. ft. storage tank, turbine engine, and gas machine.

Provo, Utah.—Tentative plans have been submitted by Utah Power & Light Co. for improving lighting system on principal streets in Provo.

Niagara Falls, Ont., Can.—City Council has inspected plans for proposed decorative lighting system in Erie Ave., between Park and Queen Sts., and referred them to fire, water and light committee with instructions to report at next meeting.

Niagara Falls, Ont.—Town engineer urges installation of lighting system on River Road, for distance of 2 miles, using ornamental standards, with arc or incandescent lamps.

CONTRACTS AWARDED.

San Rafael, Cal.—By city trustees contract for installation of ornamental street lighting system to Pacific Fire Extinguisher Co., San Francisco, at $14,-165. Plans call for 97 electroliers five-lamp clusters, maintained by underground wires. Eugene W. Smith is city clerk.

New Orleans, La.—For contract 59-D, electric machinery for drainage system, by Sewerage and Water Board, to Allis-Chalmers Co., at total of $236,872. Work will include four 600 and seven 1,200-hp. synchronous motors, a 1,200-hp. induction motor, eleven 50-kw. motor generators, eleven motor-driven rotary vacuum pumps, nine switchboards, six 1,200, three 750 and one 450-kva. transformers, a 150-kw. rotary converter, auxiliary apparatus, consisting of starting compensators, small transformers, electrolytic lightning arresters, etc. Other bidders: General Electric Co., $239,735, and Westinghouse Electric & Mfg. Co., $284,649.

Westfield, Mass.—By Westfield Gas & Electric Light Works, to General Electric Co., at $11,728, for supplying and installing complete a 600-kw. turbine alternator, and to Alberger Pump & Condenser Co., at $4,910, for surface condenser.

Glasgow, Mont.—For installation of new unit in municipal electric light and power plant by City Council to Caird Eng. Co., of Helena, Mont.

Burnt Hills, N. Y.—The Ballston town board have made contract with Schenectady Illuminating Company to light streets of Burnt Hills and Ballston Lake for period of five years at $16 for each light. There will be 36 lights to burn from one hour after sundown to one hour before sunrise.

FIRE EQUIPMENT

Lindsay, Cal.—An election will be held in a short while to vote on bond issue of $10,000 for purchase of new apparatus.

San Francisco, Cal.—Plans for new fire alarm station in Jeffedson Square have been prepared by City Board of Consulting Architects, and interior arrangement of building has been designed by City Engineer.

New Britain, Conn.—Clerk has submitted information pertaining to cost of tractors, pumping engines and ladder trucks. Prices submitted for tractors were as follows: C. J. Cross Front Drive Tractor Company, $4,000; American LaFrance Fire Engine Company, $4,500 to $5,000; Front Drive Motor Company, $3,950; American & British Manufacturing Company, $4,500; Couple Gear Freight Wheel Company, $5,500. All quotations include attaching to apparatus. Prices for pumping engines ranged from $8,000 for 70-horse-power 500 gallon pump to $9,000 for a 100-horse-power 700 gallon pump, both including chemical tanks and fitted with hose carrying bodies. Price of hook and ladder trucks ranged from $6,000 to $11,000.

Muncie, Ind.—Mayor recommends purchase of motor fire apparatus.

Clinton, Mass.—Town will vote on question to raise and appropriate sum of $1,500 for purchase of hose and the repair of fire alarm system.

North Adams, Mass.—It is understood that $6,500 will be sum asked for by Chief H. J. Montgomery for purchase of motor fire apparatus for Fire Department. According to report, $5,500 will be asked for purchase of combination hose and chemical truck and $1,000 for purchase of runabout to be used by chief of department.

Sangus, Mass.—Town will vote on purchase of auto pump engine with capacity of 700 gallons per minute.